DEVELOPMENTS IN GENERATIVE A.I. AND MACHINE LEARNING – PAGE 18

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PHOTO: JERRY ZEIDENBERG

Canada's Synaptive innovates in neuroimaging

Headquartered in Toronto, the company designs and manufactures its own MRIs for neuroimaging, as well as robotic exoscopes, which are used in neurosurgery. Both products are solving important problems – MRIs have proven to be the gold standard for identifying strokes, while the exoscopes reduce fatigue among surgeons and improve patient imaging. Pictured is executive VP Shawn Campbell. **SEE STORY ON PAGE 14**

ELNA Medical emerges as a healthcare AI powerhouse

BY JERRY ZEIDENBERG

MONTREAL – ELNA Medical Group, Canada's largest network of integrated medical clinics, has become the sole Canadian partner of an innovative project in the U.S. that's creating the world's first, general-purpose LLM for healthcare. The effort is being organized by Silicon Valley-based Hippocratic AI, which has already tested its AI-driven Large Language Model (LLM) and claims that it outperforms OpenAI's ChatGPT when it comes to medical tests.

"There has been a huge explosion in AI activity recently, with tools like ChatGPT getting a lot of attention," said Maxime Cohen, chief AI officer at ELNA Medical. "But Hippocratic AI is the first to focus on healthcare, specifically on patient-focused applications. And for this reason, it has outperformed ChatGPT on the majority of medical exams and certifications."

Indeed, Hippocratic AI ran tests and found that its LLM beat ChatGPT on 105 of 114 healthcare exams and certifications. It also scored higher when it came to healthcare specific vocabulary and measurements of bedside manner.

ELNA is co-developing the first Large Language Model that's focused on healthcare.

Dr. Cohen, a full professor specializing in artificial intelligence at McGill University, leads the AI work at ELNA Medical. (He earned his PhD at MIT, in Cambridge, Mass., worked at Google AI and taught for some time at New York University.)

He noted that ELNA is co-developing the LLM with Hippocratic AI, along with several other healthcare partners in the United States, including Cincinnati Children's Hospital, Universal Health Services (UHS) and Capsule.

One of the first applications the group is working on has been dubbed the "super-nurse" by Hippocratic AI's co-founder and CEO, Munjal Shah. The super-nurse will be able to follow up with patients who are discharged from hospital, making sure they are taking their medications, that their wounds are healing, and that they are recovering well.

If not, the computerized system, using voice or other types of communication, will be able to arrange follow-up care for the patient – thereby improving medical outcomes and reducing hospital readmissions and trips to the ER. ELNA Medical is helping to develop and test the application, making

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Montreal's ELNA Medical emerges as a healthcare AI powerhouse

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sure that it's ready for prime time and applicable to the Canadian market.

As Dr. Cohen observed, in addition to creating the algorithms and systems to accomplish this task, ELNA's network of I.T. professionals and clinicians are making sure that's it's done in a safe, responsible, and effective manner and one that protects the privacy of the patients.

Moreover, "there's always a human in the loop," asserted Zachary Stauber, chief strategy officer at ELNA Medical. "Nothing happens without being reviewed by a nurse or doctor." At a time when generative AI systems have been found to make errors, the human review is there to make sure everything is accurate and done in an ethical way.

For its part, ELNA operates nearly 100 medical clinics and points of care across five Canadian provinces. It also has a home monitoring division, a cardiac monitoring company, and a virtual visits service. The company began as a medical laboratory organization and continues to operate labs.

Further to the work it's conducting with Hippocratic AI, ELNA is developing its own AI-driven tools and applications. Indeed, it is emerging as one of Canada's powerhouses in the development of real-world solutions that use AI to improve the delivery of healthcare.

"We're applying AI before, during and after the appointment," explained Stauber.

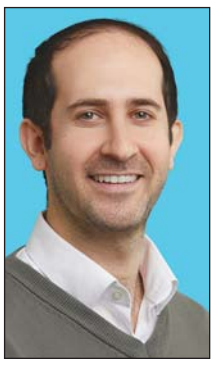
He gave examples of how the team at ELNA Medical is working on developing solutions in all these areas. Before a patient comes to a medical appointment, he noted, the AI-driven system will be actively combing through its records, checking on whether the patient is due for tests such as a mammogram or colonoscopy.

"It can look at the age of the patient and other factors, but it can also cross-reference the patient's family history, to see if there's a history of cancer, for example, and whether the patient should be doing certain types of screening," said Stauber.

The result of this analysis will be, of course, brought to the attention of the physician so that it can be discussed during the appointment.

Moreover, the system will also analyze the type of appointment that's needed for the patient, along with the patient's preferences. "It looks at whether the appointment can be done virtually, at home, or if it must be at the clinic," commented Stauber.

Maxime Cohen



Zachary Stauber

Another major component on the roadmap is a decision-support system for clinicians. It will be able to assist the doctors, advising them on best practices and the latest findings in medical science.

"With our lab, we're at the forefront of the science," said Stauber. "We know the latest tests that are available and the newest markers. We're building all this into the system."

And post-appointment, the system will be following up with the patient, to make sure they got their medication and that they're taking it appropriately, or whether they scheduled a test that was recommended by the doctor, and more.

This is much like the "super-nurse" under development with Hippocratic AI, where the LLM is following up with discharged hospital patients.

In an interview with Hippocratic AI's Munjal Shah earlier this year, Shah observed there's not enough follow-up with patients, due to the severe shortage of nurses – in North America and worldwide. However, an LLM could conceivably do the work, something that's now under development.

Impressively, ELNA's AI-related projects don't stop there.

Dr. Cohen noted the company is also working on AI-driven dashboards that monitor a host of operational variables at its clinics across Canada. "We're tracking all kinds of metrics at our clinics. Because to understand and improve, you first have to measure," he said.

As an example, they're tracking lead times to see a physician. This metric has been noted by the Canadian Medical Association and the Fraser Institute as one of the chief complaints of patients, as they often have trouble getting an appointment with their family doctor in a reasonable amount of time.

While in other countries, patients can obtain an appointment the next day, Canadian patients must often wait weeks.

"We're benchmarking our results against the Fraser Institute's rankings when it comes to lead times," said Dr. Cohen.

AI can help clinic efficiency by predicting and spotting no-shows and late cancellations, a troubling occurrence for medical offices. "It's a big, wasted opportunity," said Dr. Cohen, as a no-show takes up a spot another patient could have had.

The AI system can be trained to predict which patients might not show up, based on past histories and other factors. It can send out alerts to these patients, reminding them of appointments and asking for confirmations.

Dr. Cohen mentioned that another pain point for clinics is the amount of time doctors must spend on note-taking. But today, generative AI has shown that it's excellent at listening to the patient-physician encounter, transcribing the conversation and creating a medical summary.

"The physician can then fine-tune the summary," said Dr. Cohen.

"It saves a lot of time for the doctor and can ultimately increase access to more patients. We're going to be piloting this in the coming months."

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Virtual Reality gives hospice patients the experiences they long for

BY HANA IRVING

What is the link between the heart-pounding thrill of free-falling from a plane while skydiving; serenity, peace, and calm felt while exploring a hidden rainforest; awe and fascination while taking in masterpieces like the Mona Lisa?

All these experiences – and more – are now available for patients and their loved ones to share at Journey Home Hospice (JHH), thanks to an innovative new pilot of virtual reality (VR) technology with MyndVR.

When Jason (we've changed his name to protect his privacy) was admitted to Journey Home Hospice, his life had been full of challenges. He had experienced homelessness since his early twenties, and at the age of 63, he now faces a terminal cancer diagnosis and the realization that some of his dreams will never be attained.

There are many other patients like Jason at the Journey Home Hospice, in the heart of downtown Toronto. The facility offers 24/7 residential hospice palliative care, specifically designed for patients experiencing homelessness and structural vulnerability.

Operated by the Saint Elizabeth Foundation (SE Health), the hospice provides specialized programs with a trauma-informed, culturally safe, and harm-reducing approach to care. Moreover, innovation and wellness are entrenched in the holistic services it provides.

Felicia Kontopidis, RN, director of care at Journey Home Hospice, demonstrates how the VR goggles work.

"Our patients are most often vulnerable and have lived lives heavily influenced by poverty, stigmatization, and structural barriers to care," reflected Felicia Kontopidis, RN, director of Care. "Most of them have not had the means or the opportunity to travel or prioritize experiences in their lifetime. The virtual reality program is opening doors that they never thought could be possible."

The process of choosing a company to work with on the VR project was led by the SE Health Innovation and Digital Health Team. They chose MyndVR, whose virtual reality technology is a new type of digital therapeutic – it utilizes software to address mental and physical conditions in patients through prevention, management, or treatment alongside traditional medical approaches.

Their VR programming and technology draws on 30 years of scientific research demonstrating that immersive technology can have four key benefits: "induces and maintains positive emotional states; reduces the perception of pain as a distraction technique; reduces feelings of isolation and loneliness; and counteracts negative emotional states."1

Embracing the spirit of innovation, SE has an unwavering dedication to excellence. "We aim to connect, innovators, researchers, frontline staff, academia, and external partners to find innovative solutions to ensure exceptional patient experiences," stated Mary Lou Ackerman, VP, Innovation and Digital Health. "Not only do patients benefit from the virtual reality experiences offered through this organization, but we also have confidence that the choice of material will demonstrate health and wellness benefits beyond pure recreation."

The technology itself is very simple to use: a lightweight pair of goggles is paired with a tablet to access original and licenced VR content, offering hundreds of immersive experiences that can be activated alone or shared with a friend or family member.

MyndVR content is particularly curated with older adults in mind and their catalogue contains a mix of comforting nostalgic experiences coupled with more intense adventure scenarios that may help individuals cross off bucket-list activities like skydiving, roller coaster rides, or even scuba diving.

"Our mission is to empower users to reach their therapeutic goals by making

CONTINUED ON PAGE 6

Interoperability is a critical factor for the success of ML applications

BY GURPREET 'GP' SINGH

Machine learning (ML) and artificial intelligence (AI) are rapidly emerging as transformative technologies in healthcare, with the potential to revolutionize patient care and outcomes. The most important and often overlooked factor enabling the power of ML and AI tools is the access to aggregated data from disparate sources that has been tested, validated, and maintained for true data integrity.

As a result, interoperability will drive the ever-evolving capabilities of ML and AI solutions within the healthcare landscape.

Healthcare interoperability: Interoperability in healthcare refers to the ability to exchange data between disparate sources and applications to access consumable and actionable data. Put simply, an interoperability solution should relieve the burden of connectivity, extraction, validation, and quality assurance of data. Solutions like LKOpera, ELLKAY's interoperability platform, work to enhance every facet of healthcare interoperability, transforming it into a complete data management platform for ML and AI solutions.

This platform empowers them to achieve their objectives of improving patient care outcomes, spanning from initial diagnosis to treatment plan modalities.

Access to data: ML applications depend on large patient data sets, extracted from the electronic health records (EHRs), practice management systems, drug and laboratory systems and other applications where patient data are stored. For ML algorithms to work to their fullest capabilities, interoperability systems need to be able to collect data from various sources, standardize it, and make it available for ML algorithms to analyze.

Imagine a scenario where a patient's medical history is fragmented across different hospital systems, making it challenging for an ML algorithm to gain a comprehensive understanding of their health. Interoperable systems can bridge these gaps through aggregation of the data sets, ensuring that the ML application has access to all relevant data despite differing source systems, resulting in more accurate diagnoses and treatment recommendations.

Validation and quality assurance: Connectivity and access to data is the first step to feeding ML and AI technologies, but what if the data extracted does not meet the qualitative standards that are required to accurately analyze and project new diagnosis and treatment recommendations?

When reviewing interoperability solutions, methodology of extraction, validation of data, and ongoing quality assurance are top of mind. At ELLKAY, all connections and integrations go through multi-step validation internally and externally to determine the quality of the data being accessed and to ensure there is no manipulation or errors that may cause undue burden to the recipient of the data.

For instance, a cancer diagnosis may require data sets from varying modules, such as genomics, radiology, lab and medication history, and additional patient history data.

The trajectory of the analysis from ML and AI solutions hinges on the belief that the interoperability solution and framework is delivering the complete set of data required for best-practice clinical care. The reluctance to adopt ML and AI solutions is for this exact reason – what if it only analyzes a portion of the data, and the wrong recommendation is provided? The questioning of the efficacy of these solutions starts with the effectiveness of extracting and validating the data necessary for proper use.

Gurpreet 'GP' Singh

Data security and privacy: Lastly, while the advantages of healthcare interoperability are undeniable, it is essential to address concerns related to data security and privacy. Interoperable systems must prioritize robust security measures and adhere to strict privacy regulations, such as PIPEDA or HIPAA in the United States. This ensures that patient data remains confidential and protected from unauthorized accessibility.

Visible interoperability must be required of all connections to patient data systems to ensure there is an auditable view of who, what, and where all data elements go.

The future of healthcare is undeniably intertwined with machine learning and digital health applications. However, to harness the full potential of these innovations, we must prioritize healthcare interoperability. It is the foundation upon which accurate diagnoses, personalized treatments, efficient workflows, and groundbreaking research can thrive.

As we move forward, healthcare organizations, technology providers, and policymakers must work together to establish and maintain robust interoperable systems. By doing so, we can usher in an era of healthcare that is not only technologically advanced but also patient-centric, efficient, and secure. The importance of healthcare interoperability cannot be overstated; it is the vital connection that ensures the promise of ML and AI in digital health become a reality.

GP has over 25 years of experience in healthcare IT and has been leading ELLKAY's interoperability solutions across all segments. He was instrumental in earning ELLKAY the position of Technical Service Provider for CommonWell Health Alliance and is involved in interoperability initiatives in the Canadian market.

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Made For life

Brant system is first in Canada to adopt cloud-based MEDITECH EHR

BY NORM TOLLINSKY

The Brant Community Healthcare System, serving the city of Brantford, Ontario, and surrounding communities, is the first healthcare organization in Canada to opt for a fully managed, cloud-based software as a service (SaaS) electronic health record (EHR).

A MEDITECH customer since 1998, Brant Community Healthcare has signed for MEDITECH as a Service (MaaS) Expanse EHR after two years of extensive consultations and research of available solutions.

The MaaS EHR will be hosted on Google Cloud and frees Brant from having to invest in hardware and IT staff to manage an on-premise system and ensures enhanced protection from ransomware attacks.

"A large teaching hospital has more money to invest in redundant data centres and has larger IT teams," said Danielle Myers, Brant Community's director of ICT, Health Information Management and chief privacy officer. "We have a very small IT team. With the MaaS option, we'll have the redundancy that we would be unable to build ourselves, which is so important in this age of cybersecurity. We'll even have access to our EHR in periods of downtime because we'll have access through the data centre on a mobile device, which is great for the continuity of patient care."

An on-premise solution would have forced Brant to grow its IT team and invest in a redundant data centre, which would easily cost $1 million, said Myers.

With MEDITECH and Google Cloud providing 24-hour security monitoring, backups and comprehensive application support, Brant will be able to focus on delivering patient care.

MEDITECH has deployed its cloud-hosted EHR at 80 hospitals across 36 states and territories in the U.S., but the deployment at Brant Community Healthcare will be a first for Canada.

"The main driver for a cloud-based SaaS solution has been hospitals wanting to get out of the hardware business," said Nick Palmieri, MEDITECH's regional sales director for Canada. "So many healthcare organizations are coming up to refreshes of their hardware because the average shelf life of a hardware implementation is five years."

Danielle Myers, director of ICT and chief privacy officer, and Alena Lukich, chief of strategy and quality.

The desire to prioritize staff and financial resources for patient care and increase security will inform more EHR procurement decisions going forward, predicts Palmieri.

"Instead of relying on an individual hospital's resources to ensure the system is hardened up all the time, you're relying on the experts at MEDITECH and Google Cloud. This is all they do. The cloud offers a whole host of engineered protocols that are evolving with the methods of the threat actors to ensure the solution is secure."

A 324-bed organization comprising Brantford General Hospital and the Willett Urgent Care Centre in nearby Paris, Brant Community Healthcare is currently using MEDITECH's Client/Server EHR but relies on a paper-based system in the Emergency Department and for ambulatory care. "Also, doctors in in-patient units are handwriting progress notes, which are then scanned into the system," said Myers.

The upgrade to MEDITECH's cloud-based Expanse EHR allows Brant Community Healthcare to move to a fully electronic solution that will also give patients enhanced access to their records and ensure interoperability with other healthcare organizations, including long-term care, primary care and home care.

The need for a new EHR was prioritized as part of a strategic plan Brant Community Healthcare began working on five years ago. "What we heard loud and clear through extensive consultations with physicians and our partners in the community was around our hybrid system and the accessibility of data," said Alena Lukich, who led the exercise as chief of strategy, quality and risk.

When Brant began the process of researching EHR options two years ago, it again consulted widely through a co-ordinating committee that included physicians, patients, family members, Ontario Health Team partners and primary care doctors in the community.

Cloud-based solutions are enabling hospitals to exit the hardware business and focus more on their patients.

The managed service offered by MEDITECH includes application management and maintenance. "In the past, we would have application analysts on our own IT team do more of the programming and changes to the system," said Myers. "With MEDITECH supplying a build team to tweak the system, our IT analysts can focus more on educating users and optimizing the use of the system."

MEDITECH's build services help to alleviate the human resource crunch affecting all healthcare organizations in the wake of COVID, said Palmieri.

"We're building the system on behalf of the hospital, so they don't have to use the resources they historically required to put fingers to keyboards. This would normally be an expense to the hospital. Instead, we include a build team that helps the client significantly. That represents a major capital and resource saving and is an important differentiator.

"Because MEDITECH prescribes so much of the implementation, we can complete the build in a timeframe of nine to 12 months, whereas in an on-premise environment, it would take 14 to 16 months," said Palmieri.

While some changes to the system are necessary to account for the unique needs of a hospital, the MaaS Expanse EHR is designed to move away from customization and help promote a pan-Canadian standard.

Instead of an up-front lump-sum payment, Brant Community Healthcare will pay for its cloud-based EHR using MEDITECH's all-inclusive subscription model, which includes its ongoing services as well as Google Cloud hosting.

"It's all included in a single monthly fee that we think is incredibly palatable and represents good stewardship of Canadian tax dollars," said Bob Molloy, MEDITECH's director, Canadian market and product strategy.

MEDITECH's decision to partner with Google Cloud was to more efficiently provide healthcare teams with the information they need to help their patients, said Palmieri. "Google provides us with greater flexibility and scalability and enables us to relieve a lot of the burden on our customers, who no longer need to worry about running out of space."

Cloud solutions also improve load times, giving providers access to information faster, including across physical, geographically dispersed locations.

Physicians also look forward to taking advantage of the opportunity to access and update records remotely. An ED doc at home, for example, will be able to reach out to a colleague in the department for a quick consult and view a patient record on a smartphone. The system also supports predictive surveillance, leveraging evidence-based clinical decision support to notify care team members of potential issues, such as signs of sepsis.

"They're also excited about physician order entry and electronic medication reconciliation," said Myers. "Currently, they have to read through the paper record from the ED to see what medications a patient came in with. Then they have to look at what they were prescribed during their hospital stay and come up with a discharge list of medications.

"It's very cumbersome and takes a lot of time. MEDITECH's Expanse EHR will bring it all up on one screen, so it's much faster and safer because any contraindications are automatically identified."

Hospice patients

CONTINUED FROM PAGE 4

therapy fun, engaging and rewarding using virtual reality," said Chris Brickler, CEO of MyndVR. "We are building the most advanced portfolio of original and licensed therapeutic VR content that enables older adults to interact with the outside world in innovative ways that promote engagement, wellness, and positive outcomes. Today, thousands of seniors across Canada, the United States, Australia and the UK are using MyndVR to make their experience with aging one that is boundless and freeing, rather than limiting."

At Journey Home Hospice, patients use the VR goggles to revisit favourite memories, or engage in adventures they may not be able to physically accomplish at end-of-life, integrating seamlessly into existing wellness activities at the hospice.

For example, one patient who had never been outside the city is able to take virtual trips with his father, bringing both a sense of joy and adventure. The street view add-in to the VR goggles also allowed another patient to stroll through their neighbourhood and revisit their childhood home.

Patients use the VR goggles to revisit favourite memories, or to engage in adventures they wouldn't otherwise have.

Patient feedback from the first two months of use indicated that 60 percent of users felt happier and less lonely after a VR experience, also expressing interest in using the technology again in the future.

The VR program is just one example of how technology is shaping hospice care at Journey Home Hospice. "We need to specialize our care to meet the unique needs of our patients," said Nancy Lefebre, COO, SVP, SE Health.

"Last year we introduced an electronic health record that improved our patient safety and care outcomes. This year we're looking to engage with technology to impact the full continuum of holistic care services in a socially innovative way."

Hana Irving is Director, Philanthropic Programs, Saint Elizabeth Foundation.

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Clinic portals improve efficiency, empower patients, reduce no-shows

As healthcare goes digital, clinics nationwide are harnessing tools to foster patient engagement, streamline operations, and elevate the quality of care. MYLE EMR superusers provided their experience optimizing online appointment booking and sharing medical information with patients: a chain of clinic owners and multiple physicians expressed their transformative experiences using MYLE Patient Portal. Here is their blueprint for success.

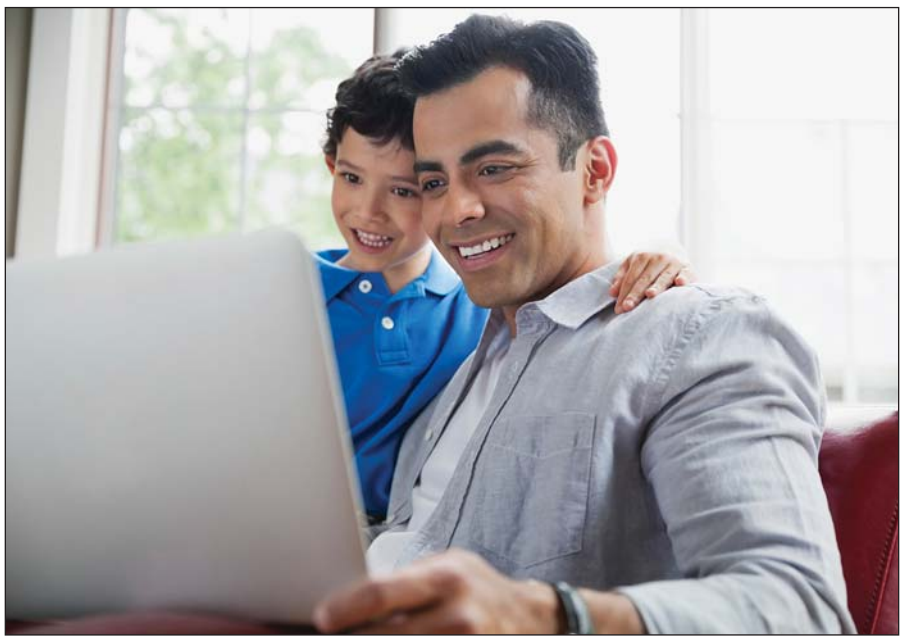
Commitment to adoption: "It's the best thing I've done for the clinic," enthused Ms. Chau Nguyen, owner and administrator of Cliniques En Route in Montreal (QC). She has been adamant on implementing the MYLE Patient Portal, estimating that 90 percent of regular patients are now connected to the portal, with her staff taking the initiative to open an account for every patient who comes through the door.

While methodologies to promote patient portal adoption may differ, one sentiment remains consistent. Having a steady eye on the benefits of the portal seems to be the driving force.

"Nowadays, everyone sees the necessity. A physician seeing a patient that has no portal, goes straight to the staff to ask why. Our physicians can't operate without the portal," added Nguyen.

Following a similar journey to successful adoption of the cutting-edge patient-engagement solution is Dr. David Harrison, in British Columbia. "MYLE is the third patient portal system we've tried and it's by far the easiest one to use in terms of booking and sending information."

For fellow BC physician Dr. Meera Anand of Harmony Care Family Practice, MYLE Patient Portal's capabilities bolstered her commitment to devote the time



to drive its adoption. Within six months, her clinic has seen a 42 percent increase of patient accounts on the portal.

Prime benefits of majority online booking: Dr. Harrison recalls, "We didn't have online booking for two weeks during the pandemic. You could see the volume of calls go through the roof. It was absolute chaos."

He now emphasizes an online scheduling approach with 80 percent of patients booking their appointments online. A view echoed by Dr. Anand who estimates that the online booking proportion stands at around 70 percent for some physicians.

The perks? Massive staff relief and a drastic dip in no-shows. "We had one call after the other, we were burning out the MOAs just for appointment booking and they had no time for other tasks," shared Dr. Anand.

In a labour shortage climate, using online appointment booking has also allowed Clinique En Route to increase efficiency. "Our no-show rate at the clinic is almost zero percent. With appointment confirmation and the portal, patients cancel appointments in advance and we can backfill the time slots," explained Nguyen.

The user-friendly interface of the MYLE Patient Portal has made it easy for patients to be in control of their own bookings. Dr. Harrison emphasized how asynchronicity can be advantageous for patients with hectic schedules.

"The grand majority of people don't want to see the physician. But when they do, they want access. Even during the day, they don't want to sit on the phone for an hour or two, waiting."

Elevated patient care and safety: Sharing messages directly with patients has simplified operations and reduced costs for Clinique En Route. With about 70 percent of communications and documents sent through the portal, paper consumption and patient traffic have decreased by just as much. "If you're sending back results to patients and then you're detailing information, as well, so they can act on it, you're deferring a visit," said Dr. Harrison.

Patients and physicians will never again worry about the potential hazards of the "no news, good news" approach – was the test normal or did it fall between the cracks?

"I love using the portal for reassurance. For women who get breast cancer screening, paps, colorectal cancer screening, I have a script that I use. When I see the result come in, I can quickly send it through the portal," shared Dr. Harrison.

This instantaneous access to information is now something patients can expect. "Patients about to travel were able to get their proof of health in seconds, right before takeoff. So much wouldn't be possible without the portal. It would be wonderful as an application on a smartphone," concluded Nguyen.

The future of care is mobile, effortless and secure: What will MYLE super users see for the future of care? Much to Ms. Nguyen's satisfaction, an MFA-secure patient mobile application called MYLE Health is on the horizon.

MEDFAR stands to reshape care delivery by offering a healthcare experience that is not only efficient for healthcare professionals, but also firmly in the hands of those it serves – the patients.

Oracle's Larry Ellison muses on generative AI and its role in healthcare

BY NEIL ZEIDENBERG

LAS VEGAS – In late September, Oracle CloudWorld 2023 and Oracle Health Conference (OHC) took place at the Venetian Resort and the newly built Caesar's Forum – an event attended by several thousand Oracle customers, employees, and media. A much-anticipated keynote speech took place featuring its co-founder, chairman and chief technology officer Larry Ellison.

While discussing Oracle's Vision of the Future, Ellison spoke about cloud technology, but he also had plenty to say about generative artificial intelligence (AI). He noted that just one year ago, generative AI showed up and changed everything.

"ChatGPT – the baby talks. Developers didn't expect that," Ellison said. "A billion-parameter model neural network, ChatGPT read Wikipedia, even though it was never trained to do so." ChatGPT answered questions in plain language and captured everyone's attention.

For many people, the use of generative AI has raised some eyebrows. The communication appears as if it's coming from a real-life person, but we must remember, it's only a machine. In the right circumstances it can be useful, but ethically, when someone goes online seeking advice from an actual trained professional – maybe not.

With a bit of training, ChatGPT does such a convincing job it can be hard to tell who's really at the other end. Although there's plenty of potential for misuse, Ellison believes it's probably the most important new technology in years. "We're about to find out," he asserted.

As an example of how extraordinary this new technology is, Ellison mentioned that AI recently designed a small molecule that treats COVID, MERS and SARS, and stops the molecules from changing. Think of the potential.

GenAI is being called a "revolutionary" technology and is changing things at Oracle – including a shift from Java to Apex coding.

"It works more reliably, and it's faster. We didn't write the Apex app – GenAI wrote it. It will be better overall," said Ellison. An autonomous database, one that manages itself automatically, is far more secure, eliminates human error and creates greater reliability.

Other important uses for AI include:

- Building specialized and generational models: train the AI to diagnose cancer and other chronic diseases.
- Keeping private data, private. It will be done faster, more accurately – free of human error.
- Unified population health data: It will take 1,000 times more data to collect and train the AI models for the purpose of personalized medicine. When ready, however, using the population health data, you will be able to make better decisions to treat patients leading to improved outcomes and reduced costs.
- DI, labs: capture the data and store it digitally, and use it to train the AI to make a more accurate diagnosis.
- RFID programs: track exactly what kind of inventory a hospital has (e.g., equipment, people) and where it is at all times.
- Cerner lab automation: Collect the data, automatically populate the information into the EHR and send that data to doctors and patients, notifying them of their test results.

> **With a bit of training, ChatGPT does such a convincing job it's hard to tell who's really at the other end.**

Although generative AI garnered the bulk of his attention, Ellison did talk about cloud. The Oracle Cloud, he explained, is different from other cloud vendors. "We can move data faster, and help you build your network more economically. We move it better and faster than anybody," claimed Ellison.

He ventured that of all the cloud vendors, the Oracle Cloud is the least expensive option. "Whether you choose to save your data to the Oracle Cloud, AWS, Azure or Google, should you wish to move it at any point to a different cloud, it shouldn't cost you anything – it's your data."

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Future-proofing: EllisDon implements new methods to ensure facilities stay up-to-date

Canada's second-largest healthcare facility provider is innovating to construct longer-lasting buildings.

As Canada's population grows, so does the pressure on our healthcare system. We need a skilled workforce to care for people, as well as the right infrastructure. Constructing more facilities is important, but there sometimes isn't as much discussion on how they are built, particularly in the refurbishment or replacement of historic facilities.

This aspect of healthcare development is integral to ensuring patient safety and supporting the overall effectiveness of medical institutions. Over the years, construction giant EllisDon has grown to become Canada's second-largest healthcare facilities provider, utilizing cutting-edge technology, implementing retrofits and data-driven analytics, equipment evaluations, building safeguards and sustainable practices, led by its Infrastructure Services and Technology Teams (ED IST). These teams include members specializing in everything from facilities services (EDFS), energy and digital services, furniture, sustainability and much more.

Below are three examples of how the teams' approach works on the ground.

Oakville Trafalgar Memorial Hospital

The 2015 opening of the new Oakville Trafalgar Memorial Hospital was an important moment for the community. The original hospital had served the public for 65 years before the doors at the new facility opened in December of that year, after 10 years of planning, design and construction, with EllisDon as the majority partner of the construction venture.

The facility included four main sections:

- The five-storey section for complex continuing care and rehabilitation;
- The 10-storey inpatient tower section containing patient bedrooms, operating theatres, and pre-and post-operative support functions;
- The four-storey therapeutic and diagnostic imaging section;
- The two-storey main hospital entrance, which also connects the rehabilitation block to the inpatient tower block.

For such an important project for the community and symbol of healthcare infrastructure evolution going from the old site to the new, it was critical to stay on budget and on schedule. EllisDon managed to do this by integrating its Facilities Management teams with the Design-Build Team early on. This isn't always common but was made possible thanks to EDFS' extensive knowledge of hospital facility management to influence its design and construction. This influenced the selection of technologies ranging from building systems, kitchen design and equipment selection, energy efficiency and building finishes.

This early integration not only contributed to completing the project on time but resulted in minimizing lifecycle costs. In fact, the facilities general manager was co-located with the Design-Build team during construction to ensure the facility was built with long-term maintenance and operational efficiency in mind.

Finally of note, while originally EllisDon was going to simply supply replacement hardware for the hospital's unified communications system, it ended up taking the lead role. To optimize this operation, the team carried out field investigations at the data centres of not only OTMH, but two other Halton Healthcare hospitals, to confirm power, rack space, cooling and network cabling requirements. These investigations were key in completing system integration capability reviews and testing, which resulted in no impacts to system and device interoperability post-upgrade, another contributing factor in staying on-time and on-budget.

Brampton Civic Hospital

For Brampton Civic Hospital, which replaced the former Peel Memorial Hospital in 2007, one of the key areas of focus was modernizing its data centre – particularly the Main Computer Room (MCR) – as Peel Memorial had first been designated a hospital in the 1920s.

EllisDon used information from an IT designer to redesign the MCR to optimally suit clinical needs. This included new electrical services, an uninterrupted power supply backup for all servers and additional AC cooling to IT equipment, essentially providing continuous power and dual cooling systems. A robust preventive maintenance program was also implemented in assisting early detection of equipment failures, allowing on-site staff to reduce lifecycle costs and minimize the potential for disrupting users.

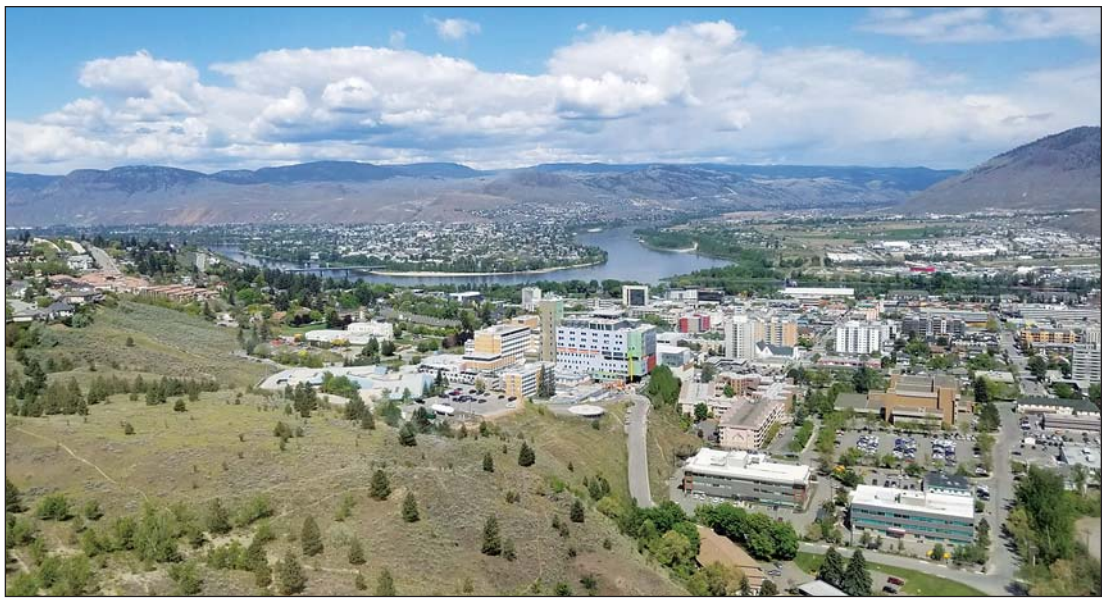
One of the most innovative decisions for Brampton Civic was its lifecycle management program, one of the first its kind, with a long-term guarantee that an asset would perform to the specifications over the term of the contract. With EllisDon staff fully responsible for the management of these services, the hospital does not have to concern itself with allocating funds for maintenance or replacement, allowing staff to concentrate on patient care without distraction.

Another modern technology strategy was the Wireless Personal Digital Assistant task management system. Essentially, the handheld technology allowed immediate task management regardless of where staff may be in the hospital, so service requests can be transferred to appropriate staff as soon as a task is received, allowing supervisors and staff to be mobile while remaining fully accessible.

The EDFS team also manages a real-time inventory tracking system, to reduce unnecessary warehouse space and associated costs, as well as an asset-tagging management system, so patient care is never compromised.

What wasn't possible to implement at the time was the concept of a converged building network – a single, consolidated physical network that is divided into subnetworks – because the technology was very much in its infancy and is much more commonplace in hospitals constructed in the last 10 years. However, as the practice evolved, EllisDon attempted to integrate it over the last two years.

Between 2021 and 2022 – thanks to the familiarity of the network infrastructure when it was built – EllisDon staff repurposed existing stand-alone network equipment into a converged one. These new interconnections between the converged project network and the standalone ones were successful and essentially centralized new server applications for the various primary systems. As a result, Brampton Civic benefits from a more operationally resilient, efficient and scalable network environment.



Oakville Trafalgar Memorial Hospital: After 10 years of planning, the new hospital replaced one that had been operating for 65 years.

Royal Inland Hospital

March 2022 was a big one for the community of Kamloops, as a new Patient Care Tower (PCT) opened at Royal Inland Hospital, which has been serving the public since 1885. Selected to design, build, partially finance and maintain the tower in 2018, the project would be completed in two phases, including the initial construction of the nine-storey PCT, connecting to the existing facilities on five levels, while also targeting LEED (Leadership in Energy and Environmental Design) certification.

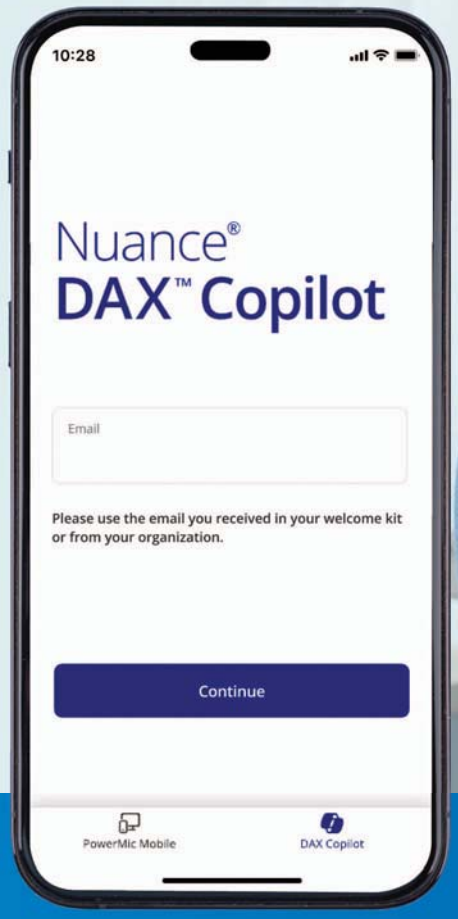
The uniqueness of the design, construction and maintenance led Infrastructure BC to estimate that EllisDon's bid provided a net present cost savings of $64 million in taxpayer dollars. Contributing factors to these savings included lifestyle cost efficiencies, effective integration with the design-build team, as well as effective risk allocation.

Before the project was even completed the tower was named 2018 North American Social Infrastructure Deal of the Year at the Infrastructure Global Awards in New York City.

This article was supplied by EllisDon.

Microsoft + NUANCE

Meet DAX™ Copilot



Serving as an AI assistant for clinical documentation, DAX Copilot enables physicians to do more with less and improve clinical efficiency, physician and patient satisfaction, and financial outcomes. This cloud-based app securely captures the patient story and automatically converts multi-party conversations into specialty-specific, structured, clinical summaries immediately after the patent encounter, reducing the burden of clinical documentation and allowing physicians to focus on their patients.

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Halton adopts new POCUS technology to advance diagnosis and treatment

BY SHIELA OLLEY

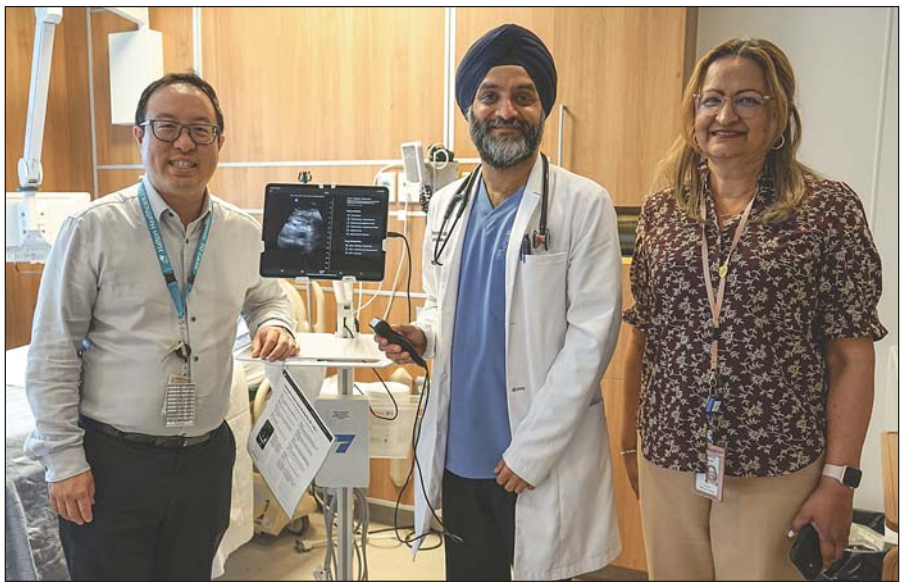
Point of care ultrasonography (POCUS) technology has been rapidly advancing and it's now being used at Halton Healthcare – a multisite healthcare organization with hospitals in Georgetown, Milton and Oakville, Ontario – as an innovative way to support clinicians in diagnosing and treating patients faster.

Due to their fast-paced nature, departments such as emergency and critical care were early adopters of ultrasound to improve the speed and accuracy of patient care by using conventional portable ultrasound technology to scan patients for specific findings. However, conventional ultrasound is costly and requires multiple transducers to scan different areas of the body.

POCUS technology is fast becoming a new standard of care in clinical medicine. It improves safety and quality for various bedside inpatient procedures and is used by critical care physicians for regular assessments and various procedures in intensive care settings.

Emergency physicians find POCUS extremely helpful in ruling out various life-threatening conditions such as hemoperitoneum or hemopericardium in trauma patients or to screen for ectopic pregnancy to name a few. "I think of POCUS as the stethoscope of today," said Dr. Rhythmpal Singh Gumber, hospitalist. "It's a very useful tool for point-of-care assessments in urgent medical situations leading to effective, time sensitive intervention. Recently, using bedside ultrasonography I was able to make a point of care decision regarding a septic patient, which facilitated a timely transfer to the intensive care unit."

Halton Healthcare opted for Butterfly iQ+, a brand-new generation of handheld POCUS devices with a single probe – the piece used to scan the patient – that can be used for the whole body. The POCUS technology works by connecting the ultrasound probe directly to a handheld phone or tablet.



Dr. Stephen Chin, Chief of Hospital Medicine, and Dr. Rhythmpal Singh Gumber, Hospitalist, with Shairoz Kherani, Director of Diagnostic Imaging & Laboratory Services.

This type of imaging can be done right at the bedside and the digital images stream directly to phones and tablets via a mobile app, providing real-time information that helps clinicians assess patients quicker and make decisions about treatment. The small device can fit in a pocket, so it provides the flexibility and mobility to travel with clinicians and image patients wherever they may be. Clinicians across departments can also readily scan, upload and review the images.

POCUS is considered a different examination than a comprehensive or limited sonographic evaluation of a patient performed in a dedicated imaging facility. While traditional ultrasound remains the gold standard, POCUS is an additional option to give staff and physicians timely answers to very specific questions.

For example, POCUS can be used to detect the presence of kidney stones, signs of lung infection, or specific cardiac conditions. POCUS can be used to clarify uncertain findings of the physical exam or provide image guidance to improve the success and safety of many procedures in the acute care setting.

Shairoz Kherani, director of Diagnostic Imaging & Laboratory Services, said an added benefit is that it's also a cost-effective tool. "POCUS devices are much less expensive than traditional ultrasound machines, and because the probes use computer chips rather than crystals, they are more robust."

At Halton Healthcare, the POCUS devices are currently being used in the emergency department and inpatient medicine units at Oakville Trafalgar Memorial Hospital and Milton District Hospital. These areas experience high volumes, and the POCUS technology enables timely clinical decision making, better patient flow, which ultimately helps to reduce wait times.

The response so far from physicians and staff in the inpatient units and emergency department is very positive. Dr. Stephen Chin, chief of Hospital Medicine, says, "Bedside ultrasound can clarify uncertain findings of the physical exam, identify important conditions in the unwell patient, and provide image guidance that improves the success and safety of many procedures in the acute care setting, particularly when time is of utmost importance for diagnosis or treatment."

In future, the devices may be used in other practice settings where this type of immediate imaging could be useful to clinicians. Under Dr. Chin's leadership, Halton Healthcare is hoping to train and encourage as many hospitalists as possible to incorporate this useful clinical tool into routine practice. To this end, a hospitalist educational committee is working towards various self-directed as well as group 'hands-on' learning opportunities.

Patients too have been impressed with the speed and efficacy of POCUS. The device was used for an ultrasound guided volume assessment for one woman experiencing cardiorenal failure. Her granddaughter who was with her remarked, "I'm pleased to see some good use of technology in this era of social media. The fact that this device can be attached to your phone is so cool!"

Shiela Olley is a Senior Communications Consultant, Communications & Public Affairs, at Halton Healthcare.

First PET-CT scanner in York Region opens at Southlake

NEWMARKET, ONT. – Southlake Regional Health Centre is proud to unveil a new PET-CT Simulator scanner at the Stronach Regional Cancer Centre, which began serving patients in September after five years of planning and construction. This new specialized equipment will improve cancer care close to home, saving more than 1,200 patients annually from having to travel to Toronto for advanced diagnostics.

The new Positron Emission Tomography – Computed Tomography (PET-CT) machine uses nuclear medicine to detect change within cells at a metabolic level, allowing for earlier cancer diagnosis. With this technology and detailed insight, Southlake will be able to deliver tailor-made cancer treatments to patients.

"We are thrilled to be opening the new PET-CT scanner to improve cancer care in the communities we serve," says John Marshman, vice president, Capital, Facilities and Business Development, Southlake. "Thanks to the investment from the Ontario government and the generosity of our donors, patients will no longer need to travel downtown for this service, and we can diagnose patients more quickly right here in York Region."

The design and construction of the PET-CT suite presented a variety of challenges, with the most notable being the radiation protection system. To achieve the required radiation protection a combination of lead bricks, sheet lead and high strength structural steel was used in the suite for advanced patient safety.

"The opening of the new PET-CT scanner is an essential support for our patients and the communities we serve," said Nathan Robinson, director, Capital Development. "It is thanks to many of Southlake's internal teams, as well as our external design team and contractors, that the renovation and installation was completed to ensure the safety of all patients, visitors and staff."

Earlier this year, Southlake representatives, local dignitaries, and donors celebrated the momentous occasion made possible thanks to an investment of more than $2.8 million dollars from the provincial government and more than $12 million in fundraising for the campaign that includes support for the PET-CT.

In 2021, Southlake Foundation launched the $20M HERE is Where Cancer Meets its Match campaign to keep pace with technological advances and grow the Stronach Regional Cancer Centre's capacity to address the increased demand for cancer care caused by a rapidly expanding and aging population. A generous outpouring of community support means that Southlake has raised over $12 million of the $20 million campaign goal, enabling the hospital to bring the PET-CT scanner to York Region.

The new PET-CT scanner will save a trip to Toronto for more than 1,200 of Southlake's patients annually.

"It took a great deal of support from many different levels to bring this advanced diagnostic equipment to Southlake. The PET-CT scanner was a comprehensive collaboration between many teams across the organization and will serve both Southlake's Cancer Program and Diagnostic Imaging," said Lorrie Reynolds, director, Central Regional Cancer Program, Stronach Regional Cancer Centre.

"This will make a big difference in the lives of our patient by ensuring we can deliver leading-edge care to patients and families throughout every step of their cancer journey," Reynolds added.

The PET-CT scanner is an advanced piece of equipment that serves two purposes. The PET identifies active cells in the body, which allows for early detection of cancer diagnosis and can determine whether cancer treatments have worked, or if cancer has spread. The CT scanner serves as a CT simulator used for treatment planning of radiotherapy for patients.

‘Smart wheelchairs’ to take patients to imaging suites being tested

BY JERRY ZEIDENBERG

TORONTO – What happens when a diagnostic imaging suite is waiting for an in-patient to arrive, but the patient is nowhere to be seen? Technologists and in some cases, a radiologist, are left cooling their heels – high-priced talent with nothing to do!

Often enough, porters are tied up and aren’t able to deliver the patient on time.

It happens more than you’d care to think, says Dr. Patrik Rogalla, Imaging Site director at the Toronto General Hospital, part of the University Health Network. And when it does, it costs the hospital money. What’s more, it can lead to rescheduling the appointment for the patient.

“Every hospital loses millions of dollars a year in this way, through lost productivity,” said Dr. Rogalla. As well, late and missed appointments due to transport problems lead to treatment and safety issues for patients who don’t get their imaging done on time.

“Patient care can be compromised,” he said. “It’s a known issue.”

As an innovative solution, Dr. Rogalla organized the testing of automated “smart” wheelchairs through the Joint Department of Medical Imaging, the diagnostic imaging department that serves three large organizations: the UHN, Sinai Health and Women’s College Hospital.

The wheelchair arrives on its own at the bedside, and patients need only to be helped into it by a nurse or assistant. Thanks to its built-in smarts, the wheelchair knows where to go and can deliver the patient to the correct imaging suite, on time, and without any human assistance.

The smart wheelchair works much like the driverless cars that are under development by Tesla and many other companies. However, in hospitals the vehicles are moving at slower speeds, and there are fewer variables to consider, such as rooms and directions.

Tests have shown the wheelchairs can get the job done.

“It’s the human portering that’s flawed,” said Vivek Burhanpurkar, president and founder of Cyberworks Robotics of Toronto, the company that’s working with Dr. Rogalla on the smart wheelchair tests.

“The wheelchairs are more reliable. They never bump into anything, while porters bump into things all the time,” said Burhanpurkar.

Dr. Rogalla and Burhanpurkar have been experimenting with automated wheelchairs since before the pandemic. “Since then, we must have logged over a thousand hours,” Burhanpurkar said. The technology, he noted, could be easily applied to a gurney or bed, enabling these objects to move unassisted through a hospital, as well.

Burhanpurkar said hospitals are a challenging environment, as they can suddenly get crowded and chaotic. However, Cyberworks Robotics has a lot of experience with automated vehicles and has been able to apply many lessons previously learned to the wheelchairs.

His business has supplied smart vehicles to a number of industries, such as warehouses, to pick up and deliver parts, and it has also produced automated cleaning vehicles.

He explained that wheelchairs – or beds – can be outfitted with computers, sensors and electric drives; the system can be programmed with its own “GPS” so that it senses where it is in a hospital. It has its own internal maps so that it can find the right rooms, and the sensors prevent it from bumping into people or objects.

He said that hospitals in the United States have now expressed interest in the product, as have airports. “In some cases, one out of three passengers at airports have requested wheelchair assistance,” said Burhanpurkar. “These airports don’t have enough personnel to escort the passengers. They’re looking to automated wheelchairs to get them around.”

Burhanpurkar said he was working on a contract with a U.S. airport, but as negotiations were currently underway, he wasn’t at liberty to provide details.

Meanwhile, for hospitals, he said the technology is ready. “Every hospital stands to gain thousands of hours a year in lost productivity. There are a lot of hours lost in imaging departments, with professionals standing around waiting for patients. And every hour you recover leads to more patients getting imaged.”

Toronto's Synaptive Medical innovates in neuro MRI and surgical imaging

Its robotic 'exoscopes' are making operations easier, while the MRI improves access for patients.

BY JERRY ZEIDENBERG

TORONTO – Most diagnostic imaging and surgical equipment is imported into Canada from the United States and abroad. But one Canadian company is bucking the trend, and it's manufacturing its own MRI scanner and robotic neurosurgical technology right in the heart of downtown Toronto.

Synaptive Medical has designed and produces a mid-field 0.50T MRI that's optimized for brain scans. It has now installed units at the QE II Health Sciences Centre in Halifax, the Toronto Western Hospital and the Toronto General Hospital, both part of the University Health Network, and has an installation pending at Sunnybrook Health Sciences, in Toronto.

As well, it has deployed one of its MRIs on the 16th floor of a private health clinic in Toronto.

While the Synaptive MRI is smaller than traditional scanners and aimed solely at neurological exams, the company is strategically situated on the cusp of a brain-exam marketplace that is rapidly growing. Neurologists and neurosurgeons – as well as ER departments – have started to order many more brain exams.

And that puts Canada's Synaptive Medical in an enviable position: it hopes to meet the demand with a scanner that offers images it claims are as good as those produced by traditional, 1.5T MRI scanners. In some cases, the Synaptive scanner's results are even better.

"The contrast between white and grey matter in the brain is better at lower field strength," said Alex Panther, vice president of R&D for MRI.

"You also have less distortion in the borders between structures," he added, such as the brain and parts of the inner ear, such as the ear canal.

Demand for neurological imaging is surging for several reasons. First, MRI exams have proven to be the gold standard for strokes of the brain. Panther explained that when patients present with signs of a stroke, CT exams have often been the first choice of clinicians.

However, CT exams often miss indications of stroke that can be detected by MRI scanners.

Panther cited a study that was conducted in Halifax on 24 patients who presented at hospital with signs of a stroke. CT exams turned out negative for 95 percent of these patients. However, the same patients were given follow-up scans in an MRI, which found positive indications for 75 percent of them.

Awareness of the value of MRI in stroke detection is leading more physicians to use this modality to determine whether their patients have suffered a stroke.

That's driving new demand for scanners, including smaller units that can be sited in emergency rooms, ICUs and surgical departments.

Specialized scanners "can provide faster access to exams," said Panther. "The goal now, for many clinicians, is to diffuse MRIs throughout the hospital."

Not only would this provide stroke patients faster access to imaging but also faster treatment –- which is so important with strokes.

Another factor that's propelling demand for MRI scanners is the emergence of new medications for treating Alzheimer's Disease.

The drugs, aducanumab (Aduhelm) and lecanemab (Leqembi), were approved in the United States in June 2021 and January 2023, respectively. They have been shown to reduce the amyloid plaques that are associated with Alzheimer's, but there is a risk of brain swelling and bleeding.

For this reason, regular MRI exams are needed.

That's putting additional pressure on the existing stock of MRI machines, leading to demand for new scanners.

Finally, Panther asserted that the growth in radiation therapies for brain cancers is also driving the uptake of MRI scanners, as physicians need to check on the effectiveness of the therapy to adjust the treatment.

Alex Panther: Recognition that MR imaging is highly effective for spotting strokes is boosting demand for the modality in hospitals.

Synaptive now employs about 200 people, with about 35 percent of them dedicated to research and development. The company is R&D intensive.

Company president and chief strategy officer Cameron Piron estimated the market for MRIs in the United States is growing at about 7 percent a year. It's harder to forecast growth in Canada, he said, with each of the 10 provinces funding most of the purchases of MRIs and conducting different policies.

Piron said the company now employs about 200 people, with 35 percent dedicated to research and development. Synaptive has become an important player in Toronto's medical technology sector, particularly in diagnostic and surgical imaging.

In the area of neuro MRIs, Synaptive has cost advantages for hospitals and clinics. But it's not just the magnet that must be taken into consideration when it comes to economics.

First, Synaptive's MRI doesn't require helium as a coolant, which means it also doesn't need a pipe for venting – a major cost and logistical headache.

Because it's optimized for one area of exams – neurological – the software interface is simpler, and training is easier for clinicians, technologists and nurses.

Finally, it requires only 250 square feet of space for siting, versus up to 1,000 square feet for traditional MRIs.

"It's hard to imagine more valuable real estate than floor space in a hospital," said Shawn Campbell, senior vice president of operations.

On another front, Synaptive Medical has a thriving business in robotic exoscopes for neuro, spine, ENT, and reconstructive/plastics surgery. They're selling the Modus X exoscope, a modernized approach to surgical microscopes, around the world.

The Modus X exoscope solves a major problem for surgeons. Often, they've had to hover over old-school, optical microscopes for hours while conducting operations. That can result in severe musculoskeletal problems and fatigue.

In contrast, the exoscope enables neurosurgeons to sit or stand comfortably while maneuvering the arms of the robotic device. Digital cameras at the end of the robotic arm, placed at the site of the operation, provide a magnified, high-resolution view that's better than the ocular microscopes they previously used.

Moreover, the Modus X makes use of a variety of fluorescing techniques – drugs used with the patient light up areas of interest, such as tumours or blood vessels, ensuring the surgeon can focus on them more easily.

Synaptive has installations in more than 15 countries and is actively selling the system in the United States, Southeast Asia, the Middle East, Europe, Australia, and Canada.

More time: Empowering healthcare professionals for improved care

BY COLETTE LEPINE

'More Time for Care," a pivotal theme that Workday has embraced, combines efficient tools and analytics to provide insights into data that can improve patient care and offer solutions to support healthcare professionals in Canada. I have learned throughout my career the importance of prioritizing self-care and celebrating successes. After nine years at Workday, it's obvious how this approach can positively impact the healthcare community.

Since I started my computing and communications career at the University of Ottawa, I've always been passionate about community service and serving the public sector. That's what drew me to Workday. Their mission to enhance the lives of healthcare professionals and patients with a "More Time for Care" ethos resonated with my commitment to creating a healthcare environment where professionals can focus on their patients with undivided attention – a form of service to the community.

Colette Lepine

I have learned to translate this ethos on a personal level to prioritize self-care and acknowledge achievements, even when our workdays at Workday are busy. I encouraged my team to do the same and pause, celebrate their wins, and take time for themselves when needed. I've found that balancing hard work and self-care ultimately brings better results for our whole team and the healthcare professionals we serve. Let's talk about how Workday provides solutions for healthcare professionals to have the time and space to focus on patient care.

Workday has emerged as a beacon of innovation and efficiency within the healthcare sector. The healthcare landscape in Canada faces various challenges and demands, including staffing, attrition, retention, burnout, and resourcing. Workday has embraced these challenges as opportunities to effect positive change. By transforming legacy systems into streamlined processes and providing IT and cloud solutions, Workday enables healthcare professionals to move from administrative tasks and allocate their time and resources more effectively, resulting in enhanced patient care.

Workday's impact on the operational efficiency of healthcare organizations highlights the strong relationship between data analytics and quality patient outcomes.

We have a publicly funded system and the same issues facing patients, doctors, and other groups as we've always had, but we don't have the administrative tools to overcome those pressures. That's where Workday comes in. Our role in healthcare extends beyond that of a technology vendor. We're a true partner in advancing patient care that understands and supports the growing demands of health professionals.

Leading the path toward the future: Looking ahead, Workday is on the cutting edge of integrating artificial intelligence (AI) and machine learning (ML) technologies, introducing augmented intelligence for healthcare. But AI and ML integration isn't just about cutting-edge technology; it's about amplifying the impact of dedicated professionals, optimizing operations, and ultimately achieving the overarching goal of "More Time for Care." Workday's commitment to sharing knowledge and sustainable growth drives the industry forward through the efforts of human expertise and technological innovation.

This sense of community and collaboration is a crucial element at Workday. Fusing human expertise with advanced analytics can improve decision-making and patient care and help us learn

Colette Lepine is the National Public Sector Leader for Workday Canada.

VIEWPOINT

LLMs take centre stage in the fight against infectious diseases

Canada's BlueDot is deploying generative AI to speed up the process of identifying threats.

BY RICHARD ZUROFF

In the past two decades there have been seven global health emergencies, which is more than we had seen in the previous 100 years combined. Because of factors like climate change, increased travel, and human encroachment into animal territories, infectious disease outbreaks are increasing in size, scale, and impact.

This is putting increased strain on healthcare systems as outbreaks spread across borders – for example, Canada's first COVID-19 case appeared in a hospital less than three weeks after the World Health Organization issued an alert.

Because the world is increasingly interconnected, outbreaks that impact Canada can start anywhere, the healthcare system needs a global view to get prepared. But that raises its own problem: how can healthcare providers possibly monitor the whole world's data for early signs of outbreaks?

Large Language Models (LLMs), the remarkable technology that powers applications like ChatGPT, are now emerging to revolutionize disease surveillance and give the healthcare sector the most valuable resource in the fight against global pandemics: more time.

Compressing time: Regardless of how fast diseases spread, intelligence can travel faster. However, turning data into insights requires parsing through the noise. The epidemiology of every outbreak is unique and there is no centralized source for global information.

Instead, the volume of data is growing every day: media, official reports, scientific publications, wastewater data, and other signals all contribute part of the picture.

But it can take days for even an experienced public health analyst to piece these clues together into a risk assessment and distribute it to healthcare teams – who then need to interpret what the local impact might be. Without more advance warning, a disease may begin to spread locally before the local healthcare system is prepared. This is where LLMs can shine.

LLMs in action: BlueDot, a Canadian infectious disease intelligence company, launched one of the world's first AI-powered infectious disease surveillance systems in 2018. The technology scans the internet to pick up signs of disease activity. The engine successfully picked up signals of what would become known as COVID-19, allowing the team of analysts, epidemiologists, and disease experts to send an alert to clients five days before the World Health Organization, and accurately anticipate the first international cities to receive infected travelers.

The advanced warning BlueDot provided was made possible by earlier generations of AI, in combination with an expert in-house team.

BlueDot has recently unveiled the latest iteration of its disease surveillance engine, harnessing the cutting-edge capabilities of LLM technology. LLMs are a specific type of AI that are trained on massive datasets to let them understand text, and perform tasks like translation, text extraction, and summarization.

> **Using Large Language Models, BlueDot's next-generation system can now extract infectious disease insights from articles in various languages within seconds.**

Thanks to LLMs, BlueDot's next-generation system can now extract infectious disease insights and contextual information from articles in various languages within seconds, allowing for real-time intelligence.

For example, by identifying the number of cases mentioned across multiple news articles and comparing that automatically to historical data, the system can detect spikes signaling a potential outbreak, the onset of seasonal diseases, geographical shifts in disease burden, and much more.

Richard Zuroff is SVP of Growth at BlueDot, a global infectious disease intelligence company that helps build resiliency against emerging and endemic disease threats.

In July 2023 alone, the engine processed over 685,000 official and non-official sources from every country in the world – identifying over 23,000 disease events. By reducing manual work, the system gives experts more time for risk assessment and gets information to end-users even faster.

Ensuring trust: There is a long history of trying to apply AI in the healthcare domain that includes massive successes as well as missteps. Since lives are potentially on the line, the sector rightfully sets a high bar for ensuring the trustworthiness of AI systems. Transparency and explainability have emerged as key requirements of any credible AI system.

And as with past advances, LLMs bring their own unique challenges. For instance, there have been many documented cases of open systems producing 'hallucinations' – a plausible-sounding output that is incorrect, like made-up legal cases.

Fortunately, there are approaches to addressing these issues. For example, BlueDot's purpose-built engine is restricted to using curated datasets separate from the general web and avoids personal information.

Expert humans are kept in the loop to review the alerts before they are distributed, auto-generated outputs link back to their sources, and the design encourages users to explore the data and methodology rather than taking answers at face value. And academic research into aligning LLMs with human preferences is continuing to advance.

Time to impact: In the battle against outbreaks, our greatest enemy is time. The more we can reduce the time spent on fact gathering and insights extraction, the faster we can inform strategy and support local health and community responses. LLMs have unlocked a critical advantage against a growing threat so that healthcare organizations are able to receive the right information, at the right time.

Digital transformation through partnerships in home healthcare

BY ALISTAIR FORSYTH AND AL HAMILTON

VHA Home HealthCare (VHA) has a vision for how technology can improve their clients' and care providers' experiences, and Canadian software vendor GoldCare is helping to bring it to life. Here, the two senior leaders share their secrets for a productive, mutually beneficial customer-vendor partnership.

VHA is a not-for-profit homecare organization that provides care and support across Ontario in people's homes, in the community and in long-term care settings. Its care providers include personal support workers, nurses, occupational therapists, physiotherapists, cleaners, social workers, dietitians and speech-language pathologists.

GoldCare creates cloud-based, integrated, health and information management software for home healthcare, children's services and long-term care organizations. It is a member of the Constellation Software Group, one of Canada's largest software companies.

Bringing VHA's vision to life: VHA's vision includes leveraging digital solutions to improve the experiences of its clients and care providers, especially given the severe health human resources challenges facing the sector.

A crucial part of VHA's digital transformation is to deliver better client communication, access to information and new client-facing digital services, including virtual care. VHA approached GoldCare about implementing a digital solution that would meet these important client needs.

> **A patient portal was co-designed by Goldcare in concert with VHA Home HealthCare and its clients.**

GoldCare's relevant product offering was mature and reliable; the company was up-front about what their product could do and how it could be enhanced to meet VHA's needs.

A solution, developed in concert with VHA's client partners, was a client services hub based on open architecture, dubbed myVHA. The design allowed VHA to plug and play different client-facing digital services and applications.

Shared values: The portal launched in January and, within months, exceeded adoption targets. It was designed to enhance communication between healthcare providers and their

CONTINUED ON PAGE 23

Beware, AI can be used by criminals, including healthcare fraudsters

BY JASON DINOVI

It's almost impossible to go a day without hearing about the limitless potential or total existential threat (depending on your perspective) posed by the rapid emergence of generative artificial intelligence.

Some of us will even project dystopian images – provided by sci-fi series like Terminator and The Matrix – about what will happen once AI gains self-awareness.

While generative AI (GenAI) holds great promise to be transformative for many industries, including healthcare, the downside is that fraudsters can also wield this new technology. That includes anything from generating fake medical records and diagnostic images in seconds to devising enhanced schemes to steal or fabricate patient identities.

AI and healthcare fraud: The intersection of GenAI and healthcare fraud demands immediate scrutiny. What does this new technology mean for healthcare fraud? Beginning with current threats, let's consider one of GenAI's greatest strengths – immediately generating human-like narratives given a few simple prompts.

It doesn't take too much imagination to see how this can help a bad actor who wants to (falsely) substantiate medical services through record documentation.

I decided to give it a go myself. With a simple prompt, I asked ChatGPT to create a medical record describing a chiropractic patient experiencing subluxation of the C4 vertebra.

Within a few seconds, I had a medical record describing the chief complaint, history of present illness, medical history, description of the exam, diagnosis, treatment plan with goal, and instructions for follow-up.

I praised ChatGPT and asked it to create five more records with varying diagnoses for each patient. Not one to turn down a user's request, ChatGPT handily creates them on the fly.

Now consider the template medical record (aka boilerplate) fraud scheme. This is when a provider submits claims for services that did not occur, accompanied by the same medical record with minor variations for each submitted claim. The idea is that human eyes will never review all the medical records together – at least not thoroughly.

The emergence of GenAI enhances this fraud scheme because a large language model-based chatbot can effortlessly devise diverse medical records. This allows users to create substantially different medical records to document varying procedures and diagnoses with a few simple keystrokes.

Another strength of GenAI is image generation. Whether capturing the surrealist style of Salvador Dali or creating strikingly realistic images of Pope Francis donning a puffer jacket, the images generated by AI applications like DALL.E 2 can be awe-inspiring. Unfortunately, the capability to recreate very real-looking images has a perfect application in healthcare fraud.

For example, I asked a gen AI app to create a dental X-ray. It's quite realistic, although not perfect – especially when compared with an actual dental X-ray image. Still, the distinction might not be immediately discernible to an untrained eye. With more experience in prompt engineering and possession of clinical expertise, I could generate better results.

Moreover, GenAI image creation is still in its infancy and is rapidly evolving. Only months ago, it was easy to identify deepfakes by spotting superfluous digits and limbs. This is becoming less true as models use more training data and users become more sophisticated. This can be said of all generative AI.

Fake voices: GenAI systems are currently capable of responding to people in real-time, generating sounds that mimic existing human voices, and creating new ones.

In other words, AI systems can speak. I'm unaware of a GenAI that can perform

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As the incidence of mental illness rises among the population, AI is being deployed

AI can help clinicians access resources in real-time, while they're treating patients.

BY DIANNE DANIEL

From helping to diagnose conditions, develop therapies and create more opportunities for personalized approaches to treatment, to alerting clinicians when patients on a hospital ward are at risk of harm, to breaking down barriers to access, artificial intelligence (AI) is transforming the delivery of mental healthcare services in Canada.

"Technology is allowing us to do the things we have pondered," said Alia Lachana, senior director, Innovations and Insights, at Kids Help Phone (KHP). "It is finally starting to catch up to human ingenuity."

Earlier this year, KHP partnered with AI research hub Vector Institute to modernize Canada's e-mental health services, with a goal of making it easier for young people to access the help they need, as well as providing front line staff with digital tools to support and augment the important work they do. More recently, they partnered with innovation hub MaRS and not-for-profit Elevate to announce a $2-million innovation challenge, inviting tech startups, to define, discover and pilot AI and e-mental health solutions for youth.

The mission is to develop and deploy responsible AI tools that both guide young people towards services as well as support the people delivering those services, said Lachana.

"We've had direct feedback from young people that receiving help, trying to find help and accessing help is challenging. It's overwhelming, it's too hard to figure out where to start, where to go, what the entry point is and quite often, having to talk about why they're seeking mental health services in multiple places can be re-traumatizing and can be a barrier to access," she said.

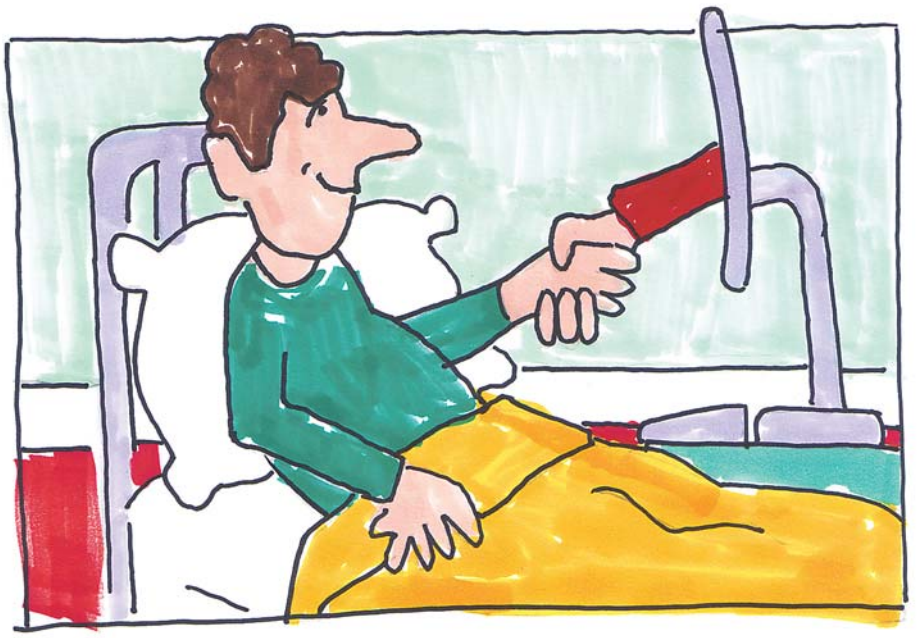
A range of projects are being explored through both partnerships. One application involves developing recognition engines that can analyze conversations as they take place between youth and counsellors in rea-time using phone, text or chat, by mapping casual language to therapeutic language, to assist in identifying and navigating underlying mental health issues. Often, phrases like 'I don't know' or 'I feel sad' or 'I think I feel this way' are indicators that counsellors listen for, and which help to identify what a person may be experiencing and where to find appropriate resources in KHP's database.

The idea is that those expressions will be tagged automatically by an AI model which would continually run analysis in the background and make informed treatment suggestions in real-time, decreasing the mental load on counsellors who would normally continue engaging with youth while assessing and looking up resources on the side.

"How amazing would it be if those things just started popping up (on the counsellors' screens) naturally," said Lachana. "What we are looking at doing is adopting AI and machine learning technologies that empower our front-line staff to provide service faster, accurately and more efficiently."

Researchers are also looking at developing equity-based, bias-aware AI models that will help to guide young people towards appropriate online mental health support in a safe, secure and non-judgmental way. According to Youth Mental Health Canada, an estimated 1.2 million children and youth in Canada are affected by mental illness and yet, less than 20 percent will receive appropriate treatment. At the same time, youth sessions conducted by KHP have shown that when young people are asked if they believe they are taken seriously when discussing their mental health concerns, the overwhelming response is no.

The AI models being developed by KHP and Vector Institute will integrate both quantitative and qualitative data, leveraging KHP's internal data – which is anonymized – as well as external sources. The goal is to develop a navigation system that reduces barriers to access by taking into account multiple inputs, such as languages spoken, living circumstances, preference for phone, text or chat, and preferred treatments. The result is expected to create a more straightforward, smoother and automatically guided experience for youth accessing e-mental health services.



"Maybe you're in a multigenerational household, maybe you're in a situation where you're not the only one using your particular device. We want to take all of those things into consideration," said Lachana. "Safe can look like multiple things to multiple people, but KHP has a core notion of what safe is, using equity-based principles, and being transparent about what our data is and how we're using it," she added.

Additional research goals include developing e-mental health services that 'learn' as people interact with them so that recommendations and treatments can be personalized. KHP and Vector Institute will also be working to map or overlay global trends on top of the AI models under development so that factors such as a rise in climate anxiety or disaster fatigue can also be considered when analyzing a person's overall mental state.

As part of the participatory design process, youth are invited to co-create the technology with KHP. Lachana pointed to a recent exercise where KHP asked young people how they felt about using a web chat. Their response – 'Why would you do that? Why would you go to an external body to talk about your mental health?' – indicates the importance of engaging youth from the start, to overcome the stigma associated with mental illness.

"Before we can even have a conversation about the tool we're developing, we have to have the conversation about mental health and accessing stigma," she said.

Youth have also been clear in their feedback that they never want to find themselves in a situation where they are speaking to an AI chatbot without knowing it. "When they want to speak to a human, they want to speak to a human. There are no ifs, ands or buts about that," said Lachana.

"What we're looking at with the AI models is to create a navigation system that takes in all of those inputs so that we can try to create a bias-aware system that in theory supports young people to access the services they're looking for," she added. "This isn't just something we're playing with or trying out … We're using AI to enhance services where it's best suited, to solve challenges, and we're being super transparent about how we do things."

The Waypoint Centre for Mental Health Care, a 315-bed specialty mental health hospital located on the shores of Georgian Bay in Penetanguishene, Ontario, is another example of a provider tapping into AI to advance mental healthcare services. The idea is to develop an early warning system to identify mental health patients at risk of self-harm so that hospital staff can intervene before an event occurs.

As part of her research into patient safety, Waypoint medical director, Clinical Informatics and Quality Standards, Dr. Andrea Waddell had initiated retrospective chart reviews to better understand the rate of incidents and ensure they weren't being missed. The hospital then engaged in real-time surveillance, stationing a researcher as an observer on an inpatient unit to detect and describe incidents as they happened.

"That work was interesting, but what's frustrating about it is it's always about things that have already happened, events that have already taken place and patient harm that has already occurred," said Dr. Waddell. "The idea was to see if there was a way we could predict patients who are at risk of deterioration, who are showing signs that would potentially lead to harmful events, and if we could intervene sooner."

To further investigate that notion, Waypoint connected to a health informatics team at York University, consisting of professor Christo El Morr, assistant professor Elham Dolatabadi and research assistant Abdul Hamid Dabboussi. Together, they are building a first-of-its-kind AI model that will serve as an early warning system to predict mental health inpatients at risk of deteriorating.

Whereas surgical early warning systems – used to detect rapid deterioration of patient health post-surgery – rely on measures like potassium level, heart rate and blood pressure to easily translate data into a threshold score to indicate a patient is medically destabilizing, the Waypoint model is incorporating observational data as well as historical data and mental health assessment data collected for

each patient using a standardized assessment template.

Roughly 30 data variables are currently being considered for inclusion in the model, including information about a patient's physical behaviour, attitude, ability to communicate, emotional state, and how well they are eating and sleeping. Vital signs as well more static information such as diagnosis and history of violence or self-harm are also being investigated as possible data variables to include, and the team expects to have its model ready for testing on a hospital ward at Waypoint in November.

As El Morr explained, the first step was to clean and integrate the data to obtain one view for each patient, a painstaking process that involves synthesizing multiple data files into a single record.

The team had to decide which advanced algorithm and machine learning tools to apply as well as the appropriate time stamp. They are also working to ensure the model works for all patient populations and doesn't contain bias towards a certain group.

"We want to look at a window in time and then based on that window, predict what could happen in the next 24 or 48 hours," he said.

"The beauty of machine learning is we will know exactly how accurate the model is before deciding to use it."

Based on her observations from the retrospective chart review, Dr. Waddell expects the data analysis will reveal repeated scenes leading to adverse events. Once the model is tested and refined, the next step is to integrate it into Waypoint's electronic medical record so that clinicians can be alerted.

"If the person was flagged as deteriorating, that result would come quickly to the physician and the team lead, usually the nurse who runs the unit," she said, adding that based on the alert, a physician may then decide to adjust medication, modify a care plan or simply go talk to the patient to try to avoid the risk of harm.

As the system goes live at Waypoint, the researchers are keen to monitor and evaluate the tool to see how it performs in a real life setting, and measure the number of false positive alerts as well as missed alerts.

At this point, the early warning system will be particular to Waypoint because it is very specific to the data variables provided. If the implementation is successful, the system could be shared with Waypoint's collaborative partners, Ontario Shores Centre for Mental Health Sciences in Whitby, Ont., and the Royal Ottawa Mental Health Centre, because all three sites use the exact same data collection process.

Dr. Waddell hopes the project will inspire other hospitals to explore a similar path. "My work can encourage them to build their own model and show them that it's possible," she said.

Dalhousie team creates AI-powered app for mental health

HALIFAX – A digital app created in a Dalhousie University lab will provide vital mental-health support to individuals who may find it difficult to find help in the over-burdened healthcare system.

Recilify, an app created by Dalhousie University's Persuasive Computing Lab, uses a mixture of artificial intelligence and machine-learning techniques to translate journal entries and contextual data into personalized, evidence-based recommendations.

Dr. Rita Orji, a professor at the Faculty of Computer Science and the director of the Persuasive lab, says the free app can detect a user's current emotional state and causative factors, offering specific solutions to help with mental health issues, including stress and trauma.

"People provide journals about how they're feeling, and then we apply artificial intelligence and machine learning approaches on this data about the user to understand their emotions at a particular point," explained Dr. Orji. "Using this information, the app is able to make recommendations, offer supports or interventions that would help them better manage the current state they're in."

Dr. Orji and her team has been developing the app for four years now. Oladapo Oyebode, a PhD candidate at the Faculty of Computer Science and member of the team, focuses on applying AI and behavior-change strategies to create personalized and emotion-adaptive systems to improve mental wellbeing, specifically resilience building.

> **As you keep using the app, it gets to know you as an individual and provides more fine-grained recommendations.**

Sanjit Jeevanand, a master's student at the Indian Institute of Technology Kharagpur and Mitacs intern, worked with Oyebode in developing the app.

While there are similar apps on the market, Recilify goes beyond the ordinary by using data that personalizes each user's experience. The personalized approach is meant to feel like you're talking to someone who knows you well, complementing doctors or clinicians.

"Similar to a doctor, the app is going to make recommendations and aim to provide a solution while ensuring people's privacy is maintained," said Dr. Orji. "As you keep using the app, it gets to know you as an individual and over time provides more fine-grained recommendations for the user."

After extensive research and development, the team is now approaching the finish line. The app is currently in beta testing.

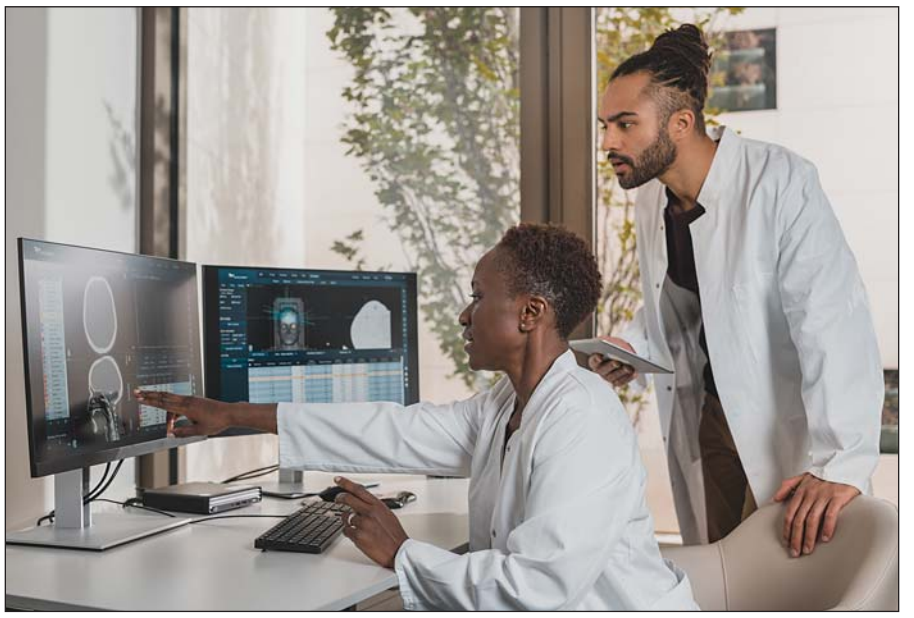
This app is in line with Persuasive Computing Lab's core mission: using technology to solve real-world problems and help people live better lives.

"A recent study emerged from the Canadian Mental Health Association, and they believe the country is in a mental-health crisis," said Dr. Orji. "There is evidence that we need a different solution to help people get mental health support and services, we thought what better way to do that than to design an app that anyone can access."

Sorce: Andrea Hart, Dal News.

Health professionals can use gen AI to improve the quality of care

BY DR. ROWLAND ILLING



For many years now, health information has been collected in a digital format, accounting for petabytes of data. However, this data has not been used to its full potential. This was primarily due to unstructured information consisting of different types of data: medical imaging, physician notes, genomic sequences, etc. There was no easy way to sort this data and extract valuable information from it. Artificial intelligence (AI) and machine learning (ML), including generative AI (GenAI), are now proving to be the solution to this problem.

AI enables automation in telehealth tools: The use of AI in healthcare is not a new phenomenon, with some of the earliest work dating back to the MYCIN project in the 1970s. However, the COVID-19 pandemic acted as a catalyst to accelerate adoption and drive innovation. Automation is inextricably associated with AI, and telehealth was the first area in the health sector automated by AI. This includes the process of setting up appointments or talking to a virtual nurse assistant through chatbots (chat robots) or voicebots (voice robots).

Chatbots allow patients to talk to a computer using natural language. AI-powered voice recognition and voice transcription turn what you speak into text. Natural language processing (NLP) converts this text into commands understandable for computers, which they can process.

With voice generation (text-to-speech), they can also answer questions. As a result, patients no longer have to queue for an hour to set up a doctor's appointment. With AI-powered voicebots, setting up appointments is now instant. There are more functions that are harnessing voicebots. Patients can even get initial advice from a 'computer-powered doctor.'

A voicebot can ask them about their symptoms and, in many cases, the computer can run a triage and suggest a treatment or – with more serious issues – suggest visiting a doctor.

During the pandemic, scientists at Massachusetts Institute of Technology (MIT) devised a machine learning system that was able to analyze specific features in a patient's cough to determine if they were an asymptomatic carrier of COVID-19.

Another example is image recognition (also known as computer vision), which is possible with deep learning (a subset of ML). Computers can now analyze radiology images to identify a narrow range of specific conditions, such as blood clots in the lung arteries (pulmonary embolism) or cancers with up to 99 percent accuracy. While they can do it thousands of times faster than a human, these results require 'expert in the loop' clinical validation from trained radiologists.

AI enables democratization of access and early detection: AlayaCare, a technology platform empowering home-based care providers and caregivers, uses AIML to provide decision-support tools and automate repetitive tasks so providers can spend more time on what matters most: caring for their patients. Leveraging AWS generative AI services like Bedrock, AlayaCare can use Large Language Models (LLMs) to automatically extract clinical information from unstructured documents (forms, care plans, and notes) and summarize what happened since the last visit so caregivers have all the information they need.

In addition, AlayaCare uses LLMs to summarize nurse notes to inquire about patient change in conditions. AlayaCare uses machine learning to build decision support tools to identify which patient is at risk of an adverse event or at risk of re-hospitalization. This helps determine which patients should be a high priority for visit scheduling and reduces wait times for high-risk patients – building transparency and trust with caregivers. Machine learning can also be used to predict employee churn to help providers retain caregivers as long as possible.

> **AI helps human physicians or nurses to automate tasks and run many of them hundreds of times faster than before.**

Application across various healthcare fields: AI is used across medical imaging as well as other data types, including text, audio and genomics. This drives automation of clinical processes (for instance, diagnosis) and administrative tasks (such as scheduling).

According to the World Health Organization (WHO), there is a one in a million chance of a person being injured while travelling by aircraft. In comparison, there is a 1 in 300 chance of an individual being harmed throughout the patient journey. Prior research has shown that up to 50 percent of all medical errors in primary care are due to administrative reasons.

The global shortage of medical professionals further compounds these problems. The WHO also estimates a projected shortfall of 10 million health workers by 2030, mostly in low and lower-middle-income countries. This makes it increasingly challenging to provide care to everyone in need.

It is AI in administrative tasks that is likely to have the most immediate impact on patients, as it can make every step of their journey smarter, not only scheduling through chat and voicebots. By analyzing patient admissions, discharges and hospital capacity in real-time, providers can concentrate care on the most critically ill patients. Systems are being built that detect patient deterioration and automate the follow-up of urgent or unexpected findings.

There is also a great potential benefit to care providers themselves. Through process automation in the provider workflow, specialists will be able to focus less on paperwork and more time on direct patient care. Enabling care providers to work 'at the top of their license' improves efficiency of the system and personal job satisfaction.

Generative AI: The latest turning point in AI is the development of generative AI (GenAI), which is a subset of deep learning. Traditional machine learning models required labelled data to train their neural networks, which makes them specific to the area of interest (therefore they are 'narrow,' usually answering specific questions). In comparison, GenAI is trained on vast troves of unlabeled data to develop foundation models (FM).

These FMs look at relationships and associations between many different parameters, which can uncover previously unknown connections. They can be used to extract and summarize data and even generate new content, depending on the data they were trained on. The impact on healthcare will be tremendous – whether collating patient data to make it easier for doctors to make diagnoses, understanding patient risk from numerous different variables (their genetic make-up, as well as environmental exposure), designing new treatments (such as the Moderna COVID vaccine) and even making doctors' letters more patient-friendly to read.

Importantly, AI is not going to replace human physicians or nurses. It simply helps them to automate tasks and run many of them hundreds of times faster than before. It also helps significantly reduce costs, especially administrative costs, which are now estimated to be around one-third of all spending on health in the US – twice as much as the US spends on caring for cardiovascular disease and three times what it spends on cancer care.

Who can make use of GenAI? Until recently, AI was used only by machine learning experts who were able to write code and build pipelines from scratch. One benefit cloud computing brings is that specific 'services' can be incorporated into applications that enable data scientists (rather than ML experts) to automate some of the data processing that is required.

In the case of Amazon Web Services (AWS), the 'Sagemaker Studio' accelerates time to build new AI applications, and there are specific tools (Sagemaker Jump Start and Bedrock) that can accelerate the utilization of a range of Foundation Models from Amazon.com and third-party providers. In the future, there will be hundreds, if not thousands, of FMs; the data the model is based on will indicate what kind of indication it is used for. Learn more about generative AI on AWS: https://aws.amazon.com/generative-ai/.

Dr. Rowland Illing is Director & Chief Medical Officer, International Public Sector Health at Amazon Web Services (AWS).

André Picard ruminates on technology

BY JERRY ZEIDENBERG

TORONTO – *Globe and Mail* columnist André Picard was the keynote speaker at the OntarioMD conference in October, and to be sure, Picard is a lively and thought-provoking speaker. Many of his comments were on the topic of generative AI, but some of his most original thinking was on healthcare technology in Canada, in general, and how slowly it is being adopted.

While Canada hems and haws, the rest of the world is already surging ahead.

In particular, he said, a combination of technology and consumerism is powering the surge, a combination that's really disrupting the way things are done. Some of what he discussed is starting to occur in Canada, but more slowly than in the United States, Europe and Asia.

Already, pharmacists are horning in on what previously were sacrosanct functions of the physician – diagnosing certain medical problems, writing prescriptions and giving shots of various sorts.

"Pharmacists are setting up health-hubs," he told a room full of doctors. "They're becoming your competitors."

Consumerism is pushing even further ahead. "Forget about sitting in a waiting room," said Picard. "Technology is going to come to us." Just as Uber Eats and Skip the Dishes delivers meals, and can also provide your meds, services are emerging that deliver medical procedures.

He observed that robots can now take blood samples. "Robots can draw

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CANADIAN Healthcare Technology

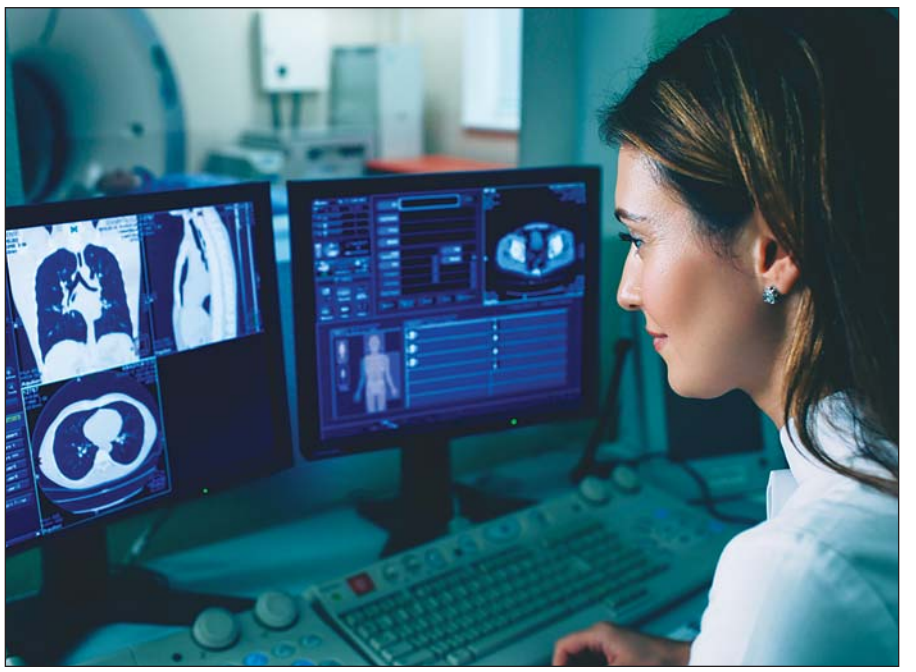
AI and radiology: how to find the latest research and best practices

Artificial Intelligence (AI) has been transforming various industries, and healthcare is no exception. As technology continues to advance, innovative AI platforms are emerging, revolutionizing the way medical information is accessed and utilized. Among these game-changers is AIKnowlegeEnable, a solution that helps radiologists apply the latest findings and guidelines as an integral part of their interpretation and peer learning workflows.

With hundreds of new scientific findings published every day, how do radiologists determine what's relevant? Real-Time Medical in partnership with the National Research Council of Canada (NRC), developed AIKnowledgeEnable to help radiologists make better-informed decisions for their patients. And it's integrated right into their reading and peer learning workflow.

AIKnowledgeEnable compiles the most recent, relevant and reliable research in an easily accessible interface to provide a time-saving tool for radiologists. The platform combines an AI-enabled search of multiple trusted, peer-reviewed, medical data sources with the collective intelligence of direct physician input to deliver the most relevant current findings and best practices based on the clinical context of the case, or one's search criteria.

AIKnowledgeEnable aids radiologists in staying updated with the latest research and evidence-based practices, helping them to provide the best possible care to their patients. It sources its data from reputable and peer-reviewed medical literature, ensuring users can access trustworthy and up-to-date information. By relying on credible sources, the platform empowers radiologists to better serve their patients.



It also offers personalized recommendations. One of the key strengths of AI is its ability to provide personalized insights based on individual data. AIKnowledgeEnable takes this a step further by analyzing users' health profiles, preferences, and medical histories to deliver tailored recommendations. This personalized approach helps users adopt healthier lifestyles and make choices that align with their unique needs.

AIKnowledgeEnable™ not only benefits the general public but also supports healthcare professionals in their practice. The app allows users to find out what medical studies are trending, and which are the most trusted by physicians. Healthcare professionals are also able to use the app to research the latest data on any medical symptom or ailment they choose.

The app combines an AI-enabled search of multiple trusted, peer-reviewed, medical data sources with the collective intelligence of direct physician input to deliver the most relevant current findings and actionable advice based on the clinical context of the case, or your search criteria. By simplifying medical information, the platform facilitates effective communication with patients, ensuring better understanding and compliance with treatment plans.

With its user-friendly interface and personalized recommendations, AIKnowledgeEnable encourages proactive health management. By empowering individuals with knowledge, the platform motivates users to take preventive measures and seek timely medical attention, leading to better health outcomes and reduced healthcare costs.

The system also provides a social platform for the collective intelligence of healthcare professionals, including confidence ratings, best practice sharing and related feedback.

Ultimately, AIKnowledgeEnable represents a significant breakthrough in healthcare technology, unlocking the potential of AI to empower individuals and healthcare professionals alike. The app compiles the most recent, relevant, and reliable research in an easily accessible interface to provide a valuable time-saving tool for users.

As AI continues to evolve, solutions like AIKnowledgeEnable hold the promise to create a healthier, more informed society, where individuals can take charge of their well-being with confidence and knowledge.

Source: Real Time Medical, realtimemedical.com

AI, and the right partner, can help solve the healthcare burnout crisis

As healthcare organizations try to meet increased demand with fewer resources, we're seeing unprecedented levels of clinician burnout across Canada. In a 2022 survey of physicians by the Canadian Medical Association, more than half (53 percent) said they were experiencing high levels of burnout. The picture looks similar in nursing, with 45 percent of nurses reporting severe burnout in 2022, up from 29 percent before the pandemic.

These high levels of burnout are leading more clinicians to reduce their workloads, retire early, or leave the profession entirely, increasing the pressure on those who remain. And that's making it harder for many patients to access the care they need.

A staggering 22 percent of Canadian adults – that's 6.5 million people – don't have access to a family physician or nurse practitioner. There's a huge gap in primary care provision that means patients are diagnosed in the later stages of disease and can't get the regular support they need to manage ongoing health conditions.

In response to the burnout crisis, healthcare organizations across the country are deploying AI-powered solutions to alleviate the pressure on overworked clinicians.

Reducing clinician burnout with AI: One of the primary contributors to burnout is the huge amount of time and effort clinicians spend on documentation. Nuance, a Microsoft company, has spent many years focusing on how the latest advances in AI can make it faster and easier for healthcare professionals to create accurate, complete documentation.

Now, Nuance's medical speech recognition solutions are able to streamline documentation workflows for many thousands of clinicians across Canada. Dragon Medical One – our clinical documentation companion – provides convenient, comprehensive support from pre-charting to post-encounter. It allows clinicians to quickly speak notes and streamline routine tasks, reducing the amount of typing and clicking that extend their work hours.

Crucially, Dragon Medical One now also offers access to the Dragon Ambient eXperience (DAX) Copilot, which combines conversational, ambient, and generative AI to fully automate clinical note creation. DAX Copilot opens up a new world of productivity and efficiency for clinicians while reducing their documentation burden and cognitive load.

Finding the right healthcare AI partner: Nuance is the leading provider of medical speech recognition solutions; healthcare organizations rely on us for proven technologies tailored specifically for clinical workflows.

But market presence is just one aspect of a great AI partner. The best technology partners also help healthcare organizations get out of the data center business and move to the cloud, enabling them to save the time and money that currently goes into infrastructure management. With Nuance solutions backed by Microsoft's Azure cloud infrastructure, it's much easier for organizations to switch to the cloud with confidence.

> **One of the primary contributors to burnout is the huge amount of time and effort clinicians spend on documentation.**

What's really exciting for the future is that the Dragon family of solutions gives healthcare organizations direct access to Microsoft's AI innovations. That will make it easier to address emerging healthcare challenges quickly with new AI-powered copilot features.

Partnership matters: It's important to remember that healthcare organizations must think strategically about AI adoption. It's not about rushing to deploy a single technology; it's about aligning with a partner with proven industry experience, trusted cloud infrastructure, and a clear roadmap for creating long-term value.

Dr. Lance Owens, chief medical information officer at University of Michigan Health-West, is a long-time Nuance partner and sees how that partnership will become even more valuable now that Nuance is a Microsoft company.

"Dragon Medical One and DAX offer powerful solutions for reducing the documentation burden and minimizing burnout," says Dr. Owens. "Nuance and Microsoft technologies and expertise are transforming clinician and patient experiences which allow us to give more patients timely access to high-quality care."

Source: Nuance

André Picard ruminates on the coming impact of technology on medicine

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blood as well as nurses – sorry, any nurses who are in the room!"

In Japan, moreover, Picard saw robots that are bathing patients and helping to change incontinent patients.

And speaking more about convenience for consumers, he talked about a Walmart in Vancouver where patients can get a vasectomy done.

While they're waiting, they can shop and a buzzer notifies them when their doctor is ready. "In one trip, they can have a vasectomy done and walk out with a bag of peas."

Of course, Picard is fully aware that technology is not a panacea, and that it's essentially a tool supporting human intelligence when it comes to medicine.

He mentioned the problems that gen AI has, such as 'hallucinating' from time to time, or essentially making things up. That's a function of the information the bot is combing, so 'garbage in, garbage out'.

And it's a major reason why gen AI systems need human supervision.

AI systems can also develop biases, also as a result of the information troves that they're fed.

He cited examples where AI systems have rejected the use of vaccines. "Like Robert F. Kennedy," he said, and perhaps could have interjected that both need adult supervision.

In a similar way, AI systems have concluded that Blacks have fewer medical needs than Whites, again because of flaws in the data that's being used – the repositories have far fewer Black patients to reference, so the AI algorithm concludes they have fewer medical issues.

Used correctly, however, Picard noted that AI systems could help solve many problems.

For example, they could help reduce the cost of personalized medicine, cutting the cost of analyzing a person's genome and linking it to the most effective medications and treatments. Imagine the ramifications of that.

Still, in the seesaw argument of the pros and cons of technology, Picard ended by stressing that AI isn't going to solve everything.

For example, in Canada there are 6.5 million people without a doctor. It's going to take policy changes to improve this situation, he said, not technology.

And there are other serious problems that contribute to health, such as food and housing. Here, he pointed to organizations like Kaiser in the United States, which are investing in housing and offering food prescriptions to patients.

> **At a Walmart in Vancouver, a customer can have a vasectomy done and pick up a bag of frozen peas afterwards.**

"They're not doing it out of the goodness of their hearts," he said. "It's a cost-effective way of keeping people out of hospitals. It's good for their bottom lines. We have to catch up with this way of thinking in Canada."

Still, generative AI is accomplishing mind-boggling tasks. He noted that AI chatbots are now able to perform many administrative jobs, such as note-taking, and can reduce the paper-burden on doctors.

"Doctors are spending 12 hours a week on paperwork, usually taking it home with them," said Picard, suggesting that generative AI could do much of this on its own, giving back the 12 hours to physicians.

Generative AI can also be used by healthcare fraudsters

CONTINUED FROM PAGE 17

these actions simultaneously and convincingly hold a conversation over the phone, but it is conceivable that this is coming.

Imagine conducting an interview to confirm rendered services, only to fall victim to the deceit of a deepfake on the other end of the line. In the meantime, it is certainly possible to use GenAI to respond to verification of service letters.

Mitigating healthcare fraud: Health providers and insurance companies are rapidly adopting GenAI. This comes as a surprise since the industry is often a late adopter of new technologies – so many physician offices, for example, still use faxes!

Already, industry trade organizations are abuzz with promises of GenAI handling prior authorizations, medical coding and billing, patient communication, and electronic health record generation. Ultimately, this will blur the lines when it comes to detecting fraud aided by GenAI.

Will regulation or payer internal policy make declaration of GenAI written content obligatory? If so, what would the cutoff be for how much GenAI can contribute?

> **Fraud has a habit of remaining essentially the same even as it evolves; fraudsters will continue to make sloppy mistakes.**

The good news is that old habits die hard. Fraud has a habit of remaining essentially the same even as it evolves: fraudsters will continue to make sloppy mistakes. As I've prompted ChatGPT to create various medical records, I have been given future dates of service. It has also repeated names that are associated with mismatching diagnoses.

It is important to remember that GenAI acts as a force multiplier rather than a total game-changer. By and large, we will still depend on investigative intellect in combination with fast, cutting-edge analytics to identify fraud successfully.

The human and AI revolution: My favorite part of Matrix Revolutions is the evolution of the relationship between people. No longer do we see ourselves pitted directly against AI machines. In the contemporary installment, humans and AI work together. We find ourselves in this same position in the healthcare fraud space. Be prepared for an arms race when it comes to the use of generative AI to both commit and detect fraud.

This article first appeared on SAS Voices.

Digital transformation

CONTINUED FROM PAGE 16

clients by allowing clients to set preferences, manage scheduling, view caregiver information and much more. It has reduced the burden on VHA's call centre, improved the caregiver experience and – most importantly – has made an enormous difference to VHA's clients. Communication is better, scheduling is easier, and clients who use myVHA are more active participants in their own care.

GoldCare and VHA's shared values came into play when VHA proposed that clients be involved in co-designing myVHA.

Not every vendor would be enthusiastic about giving end-users that degree of input. But GoldCare knew that client involvement is central to everything VHA does and trusted that giving these important end-users a seat at the table would improve the product.

And it did. VHA's client partners contributed ideas and feedback starting at the design phase right through to completion. They even went on to participate in promoting the portal.

As an example, the end-users had a specific request about how their care providers' names would be displayed. Instead of just first names, the portal can now display first name and last initial, eliminating the confusion that arose when a client had two providers with the same first name.

Another client-requested feature was the addition of a new, view-only account type for family members of VHA clients. GoldCare added this much-appreciated feature, which allowed family members and other unpaid caregivers to view schedules and keep track of the care being provided.

This feature will be complemented by a notification centre, another feature requested by VHA's client partners, allowing them to receive alerts about any changes to their schedule.

For each feature request, GoldCare provided specifications and mocked-up designs in response to client feedback. GoldCare also made valuable recommendations and provided user experience expertise to ensure that the features were designed in a way that was useful and useable for the portal's end-users.

What's the secret to this mutually beneficial relationship?

On the customer side, VHA brings an appetite for innovation and a willingness to share all the details of their vision with their software partner. That allows GoldCare to make strategic and practical recommendations on how to meet VHA's goals.

For the vendor, GoldCare has a partner in VHA willing to invest in co-developing innovative new features to meet VHA's needs, knowing that these would also benefit GoldCare's other customers.

Another factor in the relationship is the shared values of openness and transparency. The lines of communication are always open. Senior leaders meet weekly, and members of their respective teams are also in constant contact.

We speak plainly with one another and share information and industry insights so that we're both aware of what's happening in the marketplace and what other organizations are working on.

When necessary, we challenge each other. Both organizations are open to discussing disagreements and working together on a shared solution that results in a win/win for both. VHA wants the best possible product for their clients and caregivers, and they know GoldCare can help them deliver it.

> **GoldCare knew that giving important end-users a seat at the table would improve the product. And it did.**

The journey we're on together is shaping and benefiting both organizations.

VHA gains operational efficiency. The new technology makes the organization more agile and lets it deliver new and improved digital experiences for clients, families, staff and clinicians.

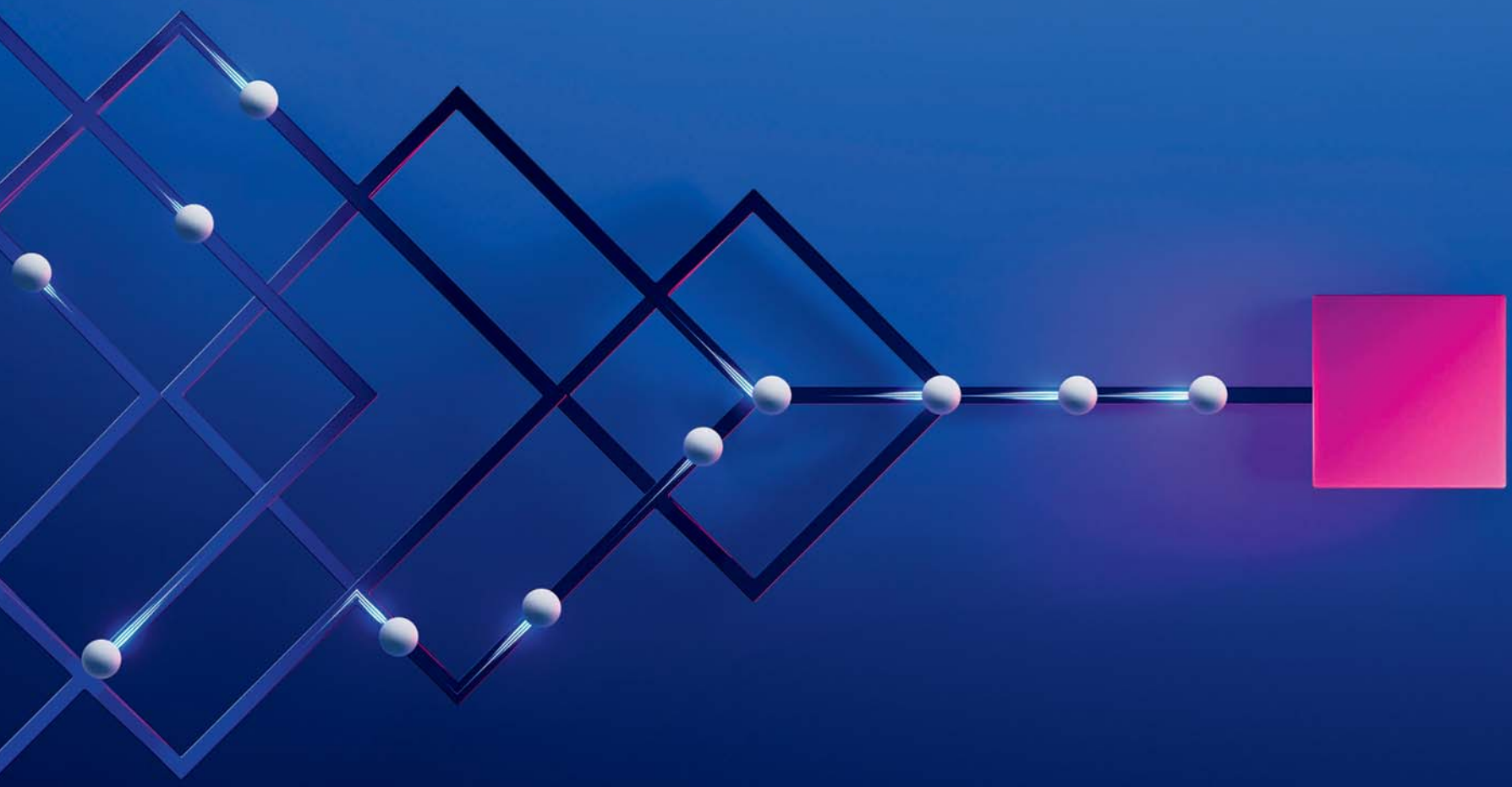
Meanwhile, GoldCare is expanding its product offering, leading to improved product sales.

There's a magic to this type of customer-vendor relationship, and it's hard to pin down. But if we were to create a recipe, we'd boil it down to this:

- Seek to understand each other's vision and goals
- Find a common strategic purpose and anchor all your decisions to that
- Be willing to take risks
- Develop a mentality that you are co-creating a solution together
- Keep the lines of communication open throughout the engagement and at all levels of the project team
- Openly share information, intelligence, plans and ideas, and be ready to respectfully disagree or challenge one another
- Collaborate, collaborate, collaborate.

With these insights, we hope many other healthcare providers and software vendors can transcend the typical customer-vendor dynamic to enjoy the mutual, strategic benefits of a genuinely collaborative and visionary partnership. The clients who receive care will surely benefit.

Alistair Forsyth is VP of Digital Health & Chief Information Officer, VHA Home HealthCare. Al Hamilton is Chief Operating Officer, GoldCare.



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