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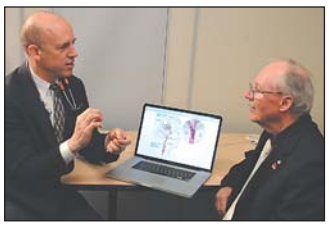
INSIDE:

MEDICATION MANAGEMENT
PAGE 10

NYGH continues to innovate
North York General Hospital won a Davies Award earlier this year for its leadership in using IT to improve patient care. The hospital has an ambitious plan to continue innovating and setting an example for others.
Page 4

Excellence in stroke care
Hospitals across Alberta have reduced the time needed to diagnose strokes and deliver potentially



life-saving tPA medication from an average of 70 minutes to just 36 minutes – a startling reduction. They've done it partly by re-engineering workflow in hospitals.
Page 4

Vaccine for cancer?
Using high-powered computers in the cloud and Deep Learning, NantHealth claims has created a cancer vaccine that can be customized for individual patients. Testing starts this year.
Page 6

Point-of-care scanning
Zebra Technologies has produced a new handheld barcode scanner and a mobile, ruggedized communication device that can be

readily disinfected. The two devices have a range of features designed to enhance patient care.
Page 18

PHOTO: COURTESY OF HIMSS

AI takes centre-stage at HIMSS conference

Ginni Rometty, CEO of IBM Corp., was the keynote speaker at the Healthcare Information and Management Systems Society conference in Orlando, in February. She focused on the importance of artificial intelligence, predicting that all healthcare organizations will need to choose an AI platform in the near future. She is pictured above in a post-keynote discussion with Stephen Lieber, CEO of HIMSS. **SEE STORY ON PAGE 6.**

SMArTVIEW project ready to go live this fall

BY JERRY ZEIDENBERG

HAMILTON, ONT. – A groundbreaking project is underway at Hamilton Health Sciences (HHS) to address a major medical shortcoming in Canada and around the world: too many patients develop complications after having cardiac and vascular surgery, and many are re-admitted to hospital after they're discharged home.

The SMArTVIEW remote-monitoring project – which has attracted over $12 million in government and industry support – uses Philips wireless electronic devices to monitor patients' vital signs following surgery and alert healthcare providers of any indications that the patient's condition may be declining. The system also enables hospital-to-home virtual recovery support.

The project aims to monitor up to 600 patients at HHS and in Liverpool, UK, at the Liverpool Heart and Chest Hospital. The system is unique in that it will monitor post-op cardiac and vascular patients, after they are transferred to step-down units or surgical wards in the hospitals, as well as at home, once they are discharged.

SMArTVIEW will continuously monitor the post-op patients in hospital, 24/7, using a variety of wireless electronic devices, to ensure their vital signs are stable. If not, alerts will be generated and sent to nurses, who can attend to the patients or escalate by contacting physicians or rapid-response teams.

> **SMArTVIEW will monitor post-op cardiology patients in the hospital and when they return home.**

Once they are discharged from hospital, usually after five or six days, patients will continue to be monitored, once a day, by nurses using two-way video on tablet computers, and by devices capable of measuring vital signs, weight, and other metrics.

"There's a real problem," said Ted Scott, chief innovation officer at HHS. "After heart or vascular surgery, there's a 6 percent to 8 percent rate of complications, and North American data show that up to 18 percent of patients can be re-admitted."

As well, about 40 percent of these post-op patients experience unrelieved pain for up to three months. These are poor outcomes for patients, and they can lead to huge costs for hospitals.

Scott compared the high rates of post-op complications with the low rates of problems encountered inside the OR. "Complication rates in the operating room are lower because patients are being closely monitored," he said.

The idea of SMArTVIEW is to raise the level of monitoring once patients have left

CONTINUED ON PAGE 9

Help's there for innovators seeking to expand into Germany and the EU

BY ANDY SHAW

Feel trumped by political developments south of the border? Concerned that what has always been quick access to the world's largest medical device market won't be easy any longer? Well then, how about as an alternative, the globe's third largest medical market, Germany?

Ranked only below the USA and China, the Federal Republic of Germany is ready, willing, and able to help you sell to its 328 billion euros-strong home market.

And so too are allied Canadian governments, international trade organizations, and other agencies keen to help – specially now, since our North American free trade deals may soon start to unravel with a new protectionist President at the controls in Washington.

The urge to assist Canadian innovators with alternative market access was very evident last fall in Toronto, when Ontario's International Trade Branch, along with the federal government's Trade Commissioner Service, hosted a one-day seminar detailing how and why you should enter the German healthcare sector.

What's more, seminar attendees also got insiders' tips on how best to enter the home markets of all other European Union (EU) countries.

Featured seminar presenter was Dr. Marcus Schmidt, head of healthcare for the federally backed German Trade & Invest (GTAI) agency, headquartered in Berlin, but with representatives in 14 cities around the world, including one in Toronto – all at the ready to assist with German market entry.

For openers, Dr. Schmidt offered some quick facts about Germany's healthcare market size and shape:

• Germany's population, thanks in part to recent immigration, has risen to 82 million people, making it Europe's most populous country and biggest medical market.

• the value of serving all those "volks" is about 11.3% of GDP, amounting to a market of 328 billion or about $465 billion Canadian. (This doesn't account for what Germans pay out of pocket for their healthcare, only insured care spending. So the market is actually bigger.)

The annual MEDICA trade show, in Dusseldorf.

PHOTO: COURTESY MESSE DUSSELDORF

• over the past 10 years, the market has been growing annually at an average rate of about 3.5 percent.

• as with most other European countries, healthcare insurance is mandatory, so virtually all Germans are covered.

• about 9% of them, however, are privately ensured at a higher cost, but with quicker access to care. Studies show that in Germany, as elsewhere, the use of private insurance increases with age.

• care is provided by just over 2,000 hospitals in Germany, but their number is declining as consolidation is merging smaller hospitals into larger ones.

• as in Canada, cost pressure on the healthcare system is seeing more hospitals run privately, accounting at present for 35% of all German hospitals and trending upwards.

• larger hospitals, including Berlin's 3,000-bed Charité Hospital, the country's largest, tend to be teaching hospitals that attract "influence leaders" to their staffs.

"We target 10 of the most influential hospitals and so we help introduce would-be exporters to those ones in particular," says Schmidt. "But we can also help make introductions to any other hospital in the country."

Specifically, Schmidt points out, the medical devices market in Germany runs approximately €33 billion, or close to $50 billion.

As a net exporter of medical technology, German medical device companies sell roughly two-thirds of their production to the rest of the world.

"So the medical device industry is a very successful one for Germany," says Schmidt. "But it's important to note that over 90% of the companies in Germany doing most of the exporting are not giants like Siemens, but rather small to medium-sized companies, most with 20 employees or less."

That's good news for potential Canadian exporters, since such smaller companies are more open to joint ventures, shared research and development, and other forms of collaboration with like-sized and like-minded companies.

There's also additional support available, thanks to a history of mutually beneficial relationships between Canada and Germany. For over 20 years, for example, the Province of Ontario and the German state of Baden-Württemberg (centred around Stuttgart) have had a formal agreement in place that involves financial support, co-operative research, even a student exchange program.

The result is that more than 30 Ontario companies have set up businesses in Baden-Württemberg and a similar number of German firms have done so in Ontario.

Though it is a major exporter, Germany nonetheless is a significant importer of medical technology. The value of the German import market for medical devices is about €10 billon or about $14 billion. Of those imports, some 28% is from North America.

In terms of German market demographics, Germany has one of the globe's oldest populations, ranking behind only Japan. Schmidt reports that by 2035 almost a third of Germany's people will be 65 years of age or older. So as elsewhere, demand for products and services connected with aging and consequently chronic disease will grow steadily.

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Alberta's stroke teams slash time taken to diagnose and treat patients

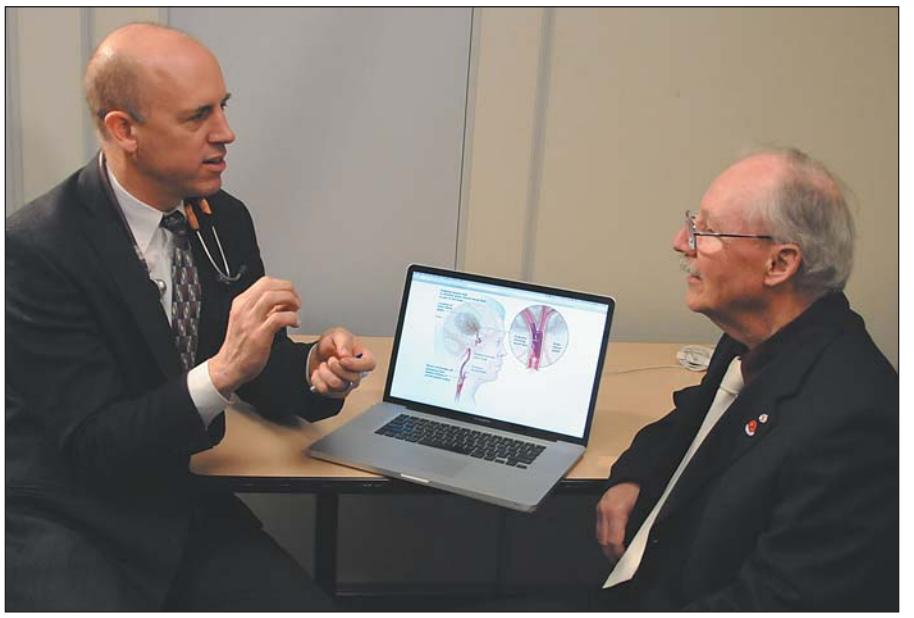
CALGARY – Alberta's 17 stroke treatment centres are now among the fastest in the world in giving patients the clot-busting drug tPA (tissue Plasminogen Activator).

Thanks to a year-long quality improvement initiative, the average time it takes from a patient's arrival at hospital to being diagnosed with stroke and injected with tPA (known as door-to-needle time) has been halved from about 70 minutes to 36 minutes.

An improvement of this degree and across such a large geographical area has not yet been reported elsewhere in the world. For example, a similar effort in the United States has seen average door-to-needle times in participating hospitals drop 20 percent, from 74 minutes to 59 minutes.

"For many years now, the accepted benchmark has been to treat patients within 60 minutes of their arrival at hospital," says Dr. Michael Hill, a Calgary-based stroke neurologist and principal investigator in a quality improvement and research program, funded by Alberta Innovates, called QuICR (pronounced 'quicker'), Quality Improvement & Clinical Research – Alberta Stroke Program.

"But we know that by doing better, we can improve outcomes for patients by preventing or limiting long-term disabilities. And when we can give stroke patients better chances to fully recover, we also eliminate potential downstream costs to the health system," says Dr. Hill, also a professor in the Department of Clinical Neurosciences at the University of Calgary's Cumming School of Medicine and a member of the Hotchkiss Brain Institute.



Calgary neurologist Dr. Michael Hill talks with patient, Ian MacNeill, about the stroke treatment he received.

During an ischemic stroke, in which blood supply to the brain is blocked, about two million brain cells die every minute and about 12 kilometres of neural connections are lost.

"One of the remarkable things that has happened in Alberta in the past year is that improvements have been made by teams in every stroke centre – not just the large hospitals in Edmonton and Calgary," says Noreen Kamal, project manager for QuICR.

"Staff in Fort McMurray, Westlock, Red Deer and smaller facilities like Grey Nuns in Edmonton have all rallied together and figured out how to significantly reduce their door-to-needle times – in some cases with limited resources at their disposal."

Covenant Health's Grey Nuns Hospital currently holds the provincial record for the case with the fastest door-to-needle time, at six minutes.

"Successes like these have been driven by staff on the front lines who worked toward a common goal," says Dr. Thomas Jeerakathil, an Edmonton-based stroke neurologist and QuICR co-lead for Quality Improvement. "There are few other areas in medicine where the concept of 'teamwork' is more important."

A patient who has had a stroke relies on the efforts of a team, which includes paramedics, emergency department nurses, registration clerks, diagnostic imaging technicians, stroke co-ordinators, emergency department physicians, radiologists and neurologists. Behind-the-scenes support from hospital administrators and managers in the emergency and diagnostic imaging departments is also critical.

Kamal, who brings a systems engineering perspective to the task, says precious minutes are saved when team members work in parallel rather than sequentially.

"A traditional clinical approach is to step through necessary tasks one at a time until a definitive diagnosis and treatment recommendation can be made," she says. With QuICR, staff work concurrently when possible. A lab technician might draw blood while the patient has a CT scan, while elsewhere a history is being collected from a family member and the tPA is being prepared.

"Improving the quality of stroke care province-wide has been made possible, in large part, through partnerships created and enhanced by AHS' Cardiovascular Health and Stroke Strategic Clinical Network," says Dr. Kathryn Todd, Vice President, Research, Innovation and Analytics for AHS.

Laura Kilcrease, Alberta Innovates CEO, congratulated the QuICR team for the tremendous work they're doing to improve outcomes for stroke patients.

"Alberta Innovates is proud to play an integral role in supporting the QuICR team. This type of innovative and outside-the-box thinking is critical and has achieved meaningful results by improving the lives of stroke sufferers not only in Alberta, but around the world."

Innovative NYGH scoops up e-health award of excellence at HIMSS

BY JERRY ZEIDENBERG

ORLANDO, FLA. – In February, leaders of North York General Hospital formally accepted a Nicholas E. Davies Award of Excellence from HIMSS – the first-ever for a Canadian acute-care hospital. Only 50 other hospitals around the world have won a Davies Award, which is given to organizations that have substantially improved patient outcomes using computerized healthcare systems.

NYGH was recognized for its multi-faceted eCare program – which among other achievements, has prevented an estimated 11,000 medication errors.

But the Toronto-based hospital isn't about to rest on its laurels.

Indeed, it's on a multi-year drive for to further improve healthcare outcomes and enhance patient satisfaction. That includes an investment in new systems.

"We're looking at the next generation of applications, and continued refreshing of our infrastructure," said NYGH's chief information officer, Sumon Acharjee.

Part of the plan is to upgrade from the hospital's current Cerner CareMobile system to a modern, multi-use system that can work with smarter and more integrated devices. The goal is to improve access to information for clinicians through the use of mobile solutions.

Acharjee was in Orlando, Florida with his colleagues to receive the Davies Award at the Healthcare Information Management and Systems Society (HIMSS) annual conference.

Not only does the team at NYGH plans to increase its HIMSS EMRAM standing, in 2018, from Stage Six to Seven – the top tier. It also intends to reach a high standing in the HIMSS Continuity of Care Maturity Model (CCMM).

The Continuity of Care Maturity Model goes beyond Stage 7 of the Electronic Medical Record Adoption Model (EMRAM). This newer model, which also has eight levels, addresses issues like interoperability, information exchange, care coordination, patient engagement and analytics.

It's designed to improve communications and interoperability both inside the hospital and with care partners and patients outside the walls of the facility.

To reach CCMM Stage 4, for example, you've got to have care coordination that's based on a 'semantic interoperable patient record'. The requirements include:

- Shared care plans that track, update, task coordination with alerts and reminders.
- E-prescribing. Pandemic tracking and analytics are in place.
- All care team members have access to all appropriate data.
- Semantic data drives actionable clinical decision support and analytics.

The NYGH team received a Davies Award at HIMSS.

Stage 5 requires a community-wide patient record that includes patient engagement. Components include:

- Community-wide patient record with integrated care plans and bio-surveillance.
- Patient data entry, personal targets, alerts are available.
- Patient data aggregated into a single cohesive record. Mobile tech engages patients.
- Community wide identity management.
- Best clinical practices are derived from care community healthcare data and operationalized across the community (continuous quality improvement and adaptation).

NYGH is already a national leader in areas like order sets – it makes use of evidence and collaboration tools from Zynx to enable clinical adoption, but has customized them in accord with Canadian and regional practices. It is also a leader in Computerized Provider Order Entry – 97 percent of physicians at the hospital currently use CPOE.

The hospital's eCare system also makes use of closed-loop barcoding for medication reconciliation – something that greatly reduces the chance of patients receiving incorrect meds or doses.

The system offers point-of-care decision support, and can transfer data from patient monitors directly into the electronic medical record.

Thanks to solutions such as these, the odds of dying at NYGH from common conditions such as pneumonia or chronic obstructive pulmonary disease have dropped by as much as 53 percent. According to the hospital, this represents an estimated 120 lives saved from these two health conditions alone.

> **"With teamplay, we have been able to identify higher dose outliners on our CT protocols and take actions to reduce the overall exposure by 25%."**
>
> Chris de Angelo, Director of Imaging Services, Cone Health, Alamance, USA

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Disclaimer: The statement by Chris de Angelo, Director of Imaging Services, Cone Health, Alamance, USA described herein is based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

SIEMENS Healthineers

Care-givers can use artificial intelligence systems as smart assistants

BY JERRY ZEIDENBERG

ORLANDO, FLA. – IBM's Watson Health is releasing its first commercial product, Watson Imaging Clinical Review, which uses artificial intelligence and analytics to reconcile cardiology reports with electronic patient records. In this initial offering, Watson Imaging Clinical Review will ensure that diagnoses of aortic stenosis, when made by cardiologists, are also transferred to the patient's electronic health record and problem list.

Aortic stenosis is a narrowing of the aortic valve, which can constrict blood flow and cause shortness of breath and chest pain; an estimated 1.5 million Americans currently suffer from this affliction.

By assuring that the finding is in the electronic record, the system helps make the finding known to all clinicians and reduces the chance that the problem is overlooked or untreated.

The ability to reconcile records for aortic stenosis is the first in a series of cardiology problems that Watson Imaging Clinical Review plans to release. There are nine others in the works, including myocardial infarctions (heart attacks), valve disorders, cardiomyopathy (disease of the heart muscle), and deep vein thrombosis.

Another product in the works at Watson Health is a clinical summary system that pulls information from a variety of sources for radiologists and cardiologists when they're conducting a study. For example, if a radiologist is checking for heart damage, the system will automatically search through the patient's records for medications, lab reports and previous DI reports for relevant information. This saves the clinician a good deal of time.

After her keynote address, IBM's CEO, Ginni Rometty, chatted onstage with HIMSS CEO Stephen Lieber.

Another work-in-progress – one of the most exciting ones – is a Deep Learning system that can analyze diagnostic images and collate the information with other information, such as the patient history, lab results, medications, etc., to come up with its own diagnosis. IBM demonstrated a version of this system at the Healthcare Information Management and Systems Society (HIMSS) conference in Orlando; when diagnosing an aortic dissection, the system used images and data to produce a diagnosis with a 95 percent confidence level.

All of these system are designed to serve as intelligent assistants to radiologists, cardiologists and other clinicians. They can act as decision support tools and helpmates that source out information that would otherwise be time-consuming for the clinicians to fetch.

In his opening remarks to the conference attendees, Dr. Michael Zaroukian, HIMSS chairman and CMIO of the Sparrow Health System in Michigan, said that clinicians today are in serious danger of burnout. "Much of it is due to the paperwork burden," he said. "There is no joy in that."

Tools like those being produced by Watson Health are capable of reducing the paperwork and low-level tasks that physicians are being required to perform today.

In a panel discussion on how Watson Health is being used at various hospitals, Dr. Tufia Haddad, an oncologist at the Mayo Clinic, in Rochester, Minn., observed that she and her colleagues are spending up to 50 percent of their time searching for information. "We need to get the time back to spend with patients," she said.

She noted that in screening patients for cancer trials, staff using Watson Health have reduced the process to eight minutes from the 30 minutes it took previously. "We're running 57 different clinical trials, and I can't remember all of the eligibility specs." However, a system like Watson Health can, and it can apply the specifications to various patients and their particular requirements.

Dr. Haddad noted that in many cases, patients don't enter trials because they don't know they're available. A computerized system, like Watson, can easily match patients with appropriate clinical trials. "Some trials don't launch because we don't get good candidates," said Dr. Haddad.

Chris Ross, the CIO of the Mayo Clinic, observed that during his tenure he has witnessed the amazing increase in the power of computers.

But it's not just the hardware that's contributed. "They systems are something like 43 million times faster than they were in 2003. It's not just Moore's Law at work (the constant improvement in computer chips). It's more to do with smarter algorithms."

In her keynote address at HIMSS, IBM CEO Ginni Rometty asserted that the application of AI to healthcare is the modern day equivalent of the 1960s moonshot. "We can transform medicine," she said. "It's within our power."

Watson, she noted, is being used to find new medications and to advance precision medicine and genomics. It is also being used to screen patients for cancer in the developing world.

"In India there is one oncologist for every 16,000 patients," she said. "So Watson Health is rolling out across India, China and other developing economies."

Rometty observed that Watson Health will not replace physicians. Instead, it will "augment what humans do, it will augment their intelligence."

NantHealth says cloud and AI have enabled it to produce a cancer vaccine

ORLANDO, FLA. – While IBM and its Watson Health division have been vocal about their plans to transform healthcare through Deep Learning, NantHealth has been quietly assembling its own platform that uses artificial intelligence to combat one of mankind's worst healthcare problems – the scourge of cancer.

At the February Health Information Management and Systems Society (HIMSS) conference in Orlando, NantHealth CEO Dr. Patrick Soon-Shiong – a billionaire through his development and sale of pharmaceuticals – gave a presentation in which he detailed the company's creation of an AI processing engine, cloud systems, and high-speed fibre connecting the platform to cancer centres.

The system is able, said Dr. Soon-Shiong, to collect the genomic and proteomic data of cancer patients in real-time. It can process the information using its own database, said to be the largest genomic database of cancer patients in the world, and then prescribe therapies based on the patient's individual cancer.

The precision-medicine therapy system is called GPS, and NantHealth has recently launched it, said Dr. Soon-Shiong.

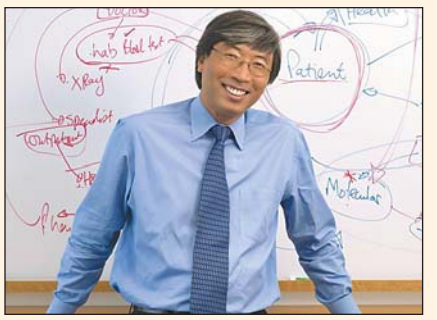
It has enabled the company to produce a customized vaccine for cancer patients, which is going to be made available this year. "2017 is the year we will implement the Nant cancer vaccine," said Dr. Soon-Shiong.

According to the company, GPS Cancer is a unique molecular profile performed in the labs of NantOmics. It integrates whole genome (DNA) sequencing, whole transcriptome (RNA) sequencing, and quantitative proteomics to provide oncologists with a comprehensive molecular profile of a patient's cancer to inform personalized treatment strategies.

Dr. Soon-Shiong acknowledged there are plenty of skeptics questioning the company's ability to deliver such a miracle drug. While Dr. Soon-Shiong played a video in which doctors and patients lauded the GPS system and the medications that have put their tumours into remission, critics have noted NantHealth's lack of peer-reviewed studies.

Nevertheless, Dr. Soon-Shiong said the company will be going forward with its own plans. "This will change the course of cancer," he asserted.

He said the company is working with 170 oncologists in the United States, and



Dr. Patrick Soon Shiong, NantHealth's CEO.

25 health plans. They are feeding patient data into the NantHealth cloud.

NantHealth's network, which includes 390,000 miles of high-speed fibre, is capable of processing large amounts of data in seconds. "There are 14 million cancer patients in the United States, with 1.7 million newly diagnosed. The number of patient data you must process each day is enormous."

NantHealth's AI platform, called the Medical Reasoning Engine, looks at genomics, proteomics and imaging data, including spectroscopy and pathology. "It's a learning system," said Dr. Soon-Shiong.

By discovering "what the tumour is saying", NantHealth can develop the right cancer vaccine for the patient. The vaccine triggers the body's own immune system to fight the cancer.

Dr. Soon-Shiong said the human body is producing cancer cells each day, as a normal process. However, at the same time, killer cells regularly fight and dispose of the cancer cells.

It's when the cancer outwits the immune system that tumours arise. The NantHealth vaccine essentially re-trains the immune system to fight and conquer the cancer cells.

But the right vaccine must be used, one that suits the individual and his or her cancer. "Cancer is an information war, which means we need to gather and harness all of your information in order to stop this dreaded disease," said Dr. Soon-Shiong.

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Think lean before loading up on IT to improve workflow in hospitals

BY JERRY ZEIDENBERG

ORLANDO, FLA. – Dr. Rueben Devlin, the former CEO of Humber River Hospital in Toronto, led the drive to create what his team calls North America's first digital hospital. The gleaming new building, which opened in 2015, makes use of the latest technologies – all designed to improve workflow and enhance medical outcomes.

But Dr. Devlin, now a consultant, is the first to advise hospitals to think lean – you should initially work out the best way of getting tasks done, and then add the appropriate technologies. "The tendency in hospitals is to add processes and technologies," he said. "But you should really be trying to simplify things."

That's what will really improve workflow and productivity, he said.

He added that technological planning should go hand-in-hand with lean methodologies. "Don't just put technologies in at the front end," he said. Instead, determine the smartest way of getting work done, and if they're needed, then implement the right technologies.

Dr. Devlin was a speaker at the recent Healthcare Information and Management Systems Society (HIMSS) in Orlando, Fla.

One example of the planning Humber River did before opening the new hospital was to look at the impact a bigger facility would have on nurses.

A study discovered that nurses were already walking 5.4 kilometres in a 12-hour shift. The bigger building would require them to walk 11.6 kilometres – over double the distance.

A solution was found in the use of automated guided vehicles (AGVs), essentially motorized platforms with wheels and computerized brains, which could deliver supplies, navigate hallways and even open and close elevator doors.

The AGVs are able to deliver 75 percent of the supplies in the hospital, saving nurses a lot of steps.

The hospital found another smart solution in the use of Ascom wireless smartphones, which have simplified hospital communications and have also enhanced patient safety. Working with Toronto-based ThoughtWire, which provided an intelligent platform, Humber River Hospital deployed the phones so that clinicians get alerts and calls on the smart devices.

That has eliminated much of the noisy paging and alerting that used to go on in the hospital, and makes it much faster and easier to send messages to the appropriate clinician. "The phones have eliminated overhead paging, which is loud and disturbs the patients," said Dr. Devlin.

Moreover, it is a more efficient way of contacting clinicians.

"What might have taken five or six phone calls in the past can be done now with one message on the smartphone," commented Holger Cordes, CEO of Ascom.

Dr. Devlin noted the system is capable of assembling teams when Code Blues are initiated – the alarms that calls together care-givers in the event of severe cardiac or pulmonary incident. However, he noted that most of the alerts in a hospital are of a non-urgent nature – such as lab or MRI results. Still, he said, it is important to get them to clinicians in a timely manner.

He observed that clinicians are very pleased with the new communication system. "Physician satisfaction is up," he said.

Creating a digital hospital, of course, is no small task. Dr. Devlin estimated there are some 17,000 devices at Humber River that are being integrated.

But he emphasized that anyone creating an intelligent hospital must first do a lot of work at the beginning to smooth out and improve the workings of the facility. "You don't want to digitize bad processes," he said.

For its part, Ascom at HIMSS announced Unite Context, an integrated communication and collaboration platform that enables hospitals to bridge the information gap between back-end systems, EHRs, and the front-end workflow.

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AGFA HealthCare

SMArTVIEW

CONTINUED FROM PAGE 1

the OR through the use of wireless, electronic equipment.

To accomplish the task, a team at HHS worked for the past two years on the design of the system and gained buy-in from clinicians. Through open procurement, the team also assembled a group of vendors who created unique solutions for in-hospital and remote, at-home monitoring.

The key vendors include Philips and ThoughtWire, which are contributing hardware and software for vital signs monitoring; QoC of Toronto, which has produced an interface that promotes patient self-care; and XAHIVE, which is consulting on cybersecurity.

The inpatient monitoring software solution, known as Philips IntelliVue Guardian, is designed to detect patient deterioration, send clinician validated vital signs from the vital sign monitoring devices to the EMR at the point of care, and to automatically alert clinicians if there is a change in patient status.

ThoughtWire's intelligent platform is being used to automatically relay the alerts to the appropriate clinicians and teams.

The inpatient hardware consists of the vital sign monitors and wireless measurement devices. The outpatient monitoring solution will use the Philips eTRAC solution. The eTrAC ambulatory telehealth program enables clinicians and patients to stay closely connected during the transition to ambulatory care for chronic disease management.

P.J. Devereaux (left) and Michael McGillion, co-principal investigators of the SMArTVIEW research project.

Recently, the SMArTVIEW development team has been fine-tuning the alerts and workflows that are a key part of the system. Dr. Michael McGillion, assistant dean of research at the school of nursing, McMaster University and SMArTVIEW project lead investigator, explained that nurses have been involved in the testing of the solution at Hamilton Health Sciences and the Liverpool Heart and Chest Hospital.

They have been involved in high-fidelity simulations where trained actors play the role of patients, while they learn to use the technology, on the hospital ward.

"They then debrief with us on the experience and this allows us to optimize the configuration of our systems, as well as the workflow," commented McGillion.

During the actual SMArTVIEW trial, which will start in the fall, McGillion noted that it is expected that over 80 nurses will be involved from both countries, along with surgeons and clinical staff.

While other vendors and healthcare systems in Canada have launched remote monitoring projects, Scott believes SMArTVIEW differs in its combination of in-hospital and at-home monitoring. He explained that most post-op patients are not closely monitored for the five to six days they are recuperating from surgery in the hospital.

In contrast, SMArTVIEW will provide comprehensive electronic monitoring in step-down units and surgical wards. Once the patient returns home, the monitoring will continue with daily, virtual visits by a nurse, who the patient will see on his or her Samsung tablet computer.

The patient will be able to discuss his condition, transfer vital signs, and also send photos of wounds.

In all, the patients will be monitored for a total of 30 days. "After 30 days, most of the danger is over," said Scott.

He pointed out that patients recovering at home will be monitored by a trained surgical nurse, based in the hospital, who is familiar with surgical issues and potential problems. In contrast, most patients convalescing at home are traditionally visited by home care nurses who are not necessarily trained to deal with post-op pain, wound care and other complications.

The SMArTVIEW project has partnered with the Liverpool Heart and Chest Hospital, in the UK, as it is a centre

CONTINUED ON PAGE 18

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Through a combination of remote patient monitoring platforms, proprietary software, patient engagement, and care coordination, Medtronic Care Management Services serves as an extension of patient care teams – amplifying efforts to manage complex patient populations **at home**.

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Oakville hospital's pharmacy automation enhances speed, accuracy

BY JERRY ZEIDENBERG

OAKVILLE, ONT. – Quick, safe and convenient are watchwords in Halton Healthcare's pharmacy department. It's one of the first in the country to install a Swisslog medication robot, which packages the various tablets and pills needed by patients into envelopes, barcodes them, and organizes the envelopes on a plastic ring.

A ring may contain four or five or more meds.

From there, they are transported to the floors of the hospital – where they're stored in Omnicell medication cabinets until needed by nurses.

As the meds are barcoded, the nurses can scan a patient's wristband and envelopes at the bedside to ensure they're delivering the right drug and dose to the right patient, at the correct time.

"We've noticed a decrease in medication incidents already," comments Sandy Saggar, Halton Healthcare's CIO. "The system helps nurses catch any mistakes before administering the wrong medication." Saggar noted the hospital is in the midst of a comprehensive survey to measure the efficacy of a number of new, computerized systems, including electronic medication management.

The hospital doesn't yet have computerized practitioner order entry (CPOE) on the front end – but that project is in the planning hopper.

"We didn't want to introduce too much change all at once," notes Helena Trabulsi, director of pharmacy, explaining that it takes time to tweak the practices of pharmacists, technologists and nurses. "We've been working on these projects [the robotic system and eMAR] for five years now."

Something the Oakville-Trafalgar Memorial Hospital has pioneered at the front-end, however, is an imaging system – connected to the pill packaging robot – that visually checks the medications being packaged.

"If something comes through that is wrong – like two of the same pills in a package, or a broken capsule – it is rejected right at the start," says Boris Curcic, pharmacy manager.

He notes that a great deal of work went into setting up the system, as about 100 images of each medication were taken to create a visual database.

"And we've got over 400 different medications in the database – they are the high volume items that are most in demand."

That's a picture database of over 40,000 images, and it's checked against each medication as it rolls into the robot.

"It means we don't need manual checking as the medications go into the robot," says Michael Wood, senior pharmacy technician. "That's a cost saving."

Trabulsi adds that instead of employing staff at the front end, tediously checking the medications going into the packaging machine, they can be used elsewhere in the pharmacy. "We're better utilizing the time and skills of our technicians," she says.

It's a thoughtful approach – one that you'll find throughout the hospital. Not only does it make better use of the skills of staff, but Halton Healthcare believes it will translate into better patient care, with improved medical outcomes.

Smart design and thinking has been incorporated into many areas of the new hospital.

For example, the inpatient portion of the hospital has been designed so that it's separated to a great extent from outpatient clinics. "In-patients are constantly being wheeled through the halls for tests, and they don't like other people seeing them on stretchers," explains Melanie Maddock, DI manager. "They're not looking their best, and it's uncomfortable for them."

The robotized medication system at Halton Healthcare includes an imaging solution that checks the meds.

By separating the inpatients and outpatients, there are fewer people walking through the inpatient corridors, which creates a sense of privacy.

"It's a different atmosphere than in most hospitals," says Maddock.

A special, patient-friendly feature of the hospital is the Emergency Department's own Imaging Centre – called the Imaging Cluster. Situated between the Emergency Department and the Diagnostic Imaging department, it gives priority to emergency patients and enables them to be imaged and diagnosed faster than at the old Oakville hospital.

"It means quicker turnaround for emerg patients," says Maddock.

The cluster benefits from two CT scanners – including a high-end, Siemens SOMATOM Definition Flash, one of the first to be installed in Canada. It 'freezes' cardiac motion so that even patients with high and irregular heart rates can now get a reliable diagnosis.

Strangely, the emergency Imaging Cluster appears to be quiet, even though emergency department throughput has increased by 20 percent since the hospital opened last November. Maddock chuckles as she explains that visitors always wonder where the patients are, and why the department isn't noisy and bustling, like the floors of many other hospitals.

The answer is that the spacious Imaging Cluster also has private consulting rooms, where emerg patients are brought before their imaging exams.

How about an Amazon-like procurement model for Canadian hospitals?

BY TIM WILSON

Healthcare's spending crisis has been a prominent news issue in 2017. In Ontario, we heard from the financial accountability office that the province must remove $2.8 billion from health spending by 2019.

Then the Ontario Chamber of Commerce published a report arguing for more efficient procurement and supply chain processes. And now, the Institute of Fiscal Studies and Democracy says the federal government has to come up with more cash.

Amidst this handwringing, there have been few specifics on how the system can save money. But one Canadian technology company, ThoughtSpeed eCommerce Ltd., has evolved its cloud-based offering to position it as a major player, driving advanced capabilities from its experience providing a SaaS-based order management system for the Canadian Pharmaceutical Distribution Network (CPDN).

CPDN is a group of 25-plus pharmaceutical companies that supply their products to over 800 hospitals in Canada using integrated technology and distribution services to lower drug costs.

"The innovation and efficiencies are realized through our software's ability to consolidate orders with multiple suppliers and warehouses," says Ken Will, ThoughtSpeed's CEO.

"This creates significant cost savings and moves beyond pharma and into medical-surgical devices and consumables."

The ThoughtSpeed technology could take the Canadian healthcare supply chain toward an Amazon-like model. However, despite the company's ability to ensure custom pricing in a multi-channel, multi-supplier environment, the healthcare sector has been slow to respond, with the mainstream news focusing on the problem and not the solution.

The report from the Ontario Chamber of Commerce, for example, devotes considerable space arguing for a framework for modern supply chain practices – but with few specifics on the technologies that will drive this change.

"Right now, wholesale ordering in healthcare is a black hole," says Mike Neary, ThoughtSpeed's VP Business Development. "But we've developed a system that supports one-stop shopping, with full inventory, contract and pricing visibility, which drives operational efficiencies and reduces overall costs.

It's the Amazon model for Canadian healthcare, which allows any supplier to ship directly."

This shift toward a consolidated, nimble, and more consumer-oriented approach has been in the air for years, but there has been little news of a technological solution because it was assumed that Canada's single-payer system, and its centralized funding models, tended to support traditional B2B technologies. This is certainly true of Ontario's Shared Services organizations (SSOs).

> **It's possible to move toward an Amazon-like ordering and delivery system for medications in Canada.**

"We bought SAP, and we coordinate Ariba for contract management," says David E. Yundt of Plexxus, an SSO that represents 10 hospitals in Ontario. "SAP is used for supply chain and finance, and Ariba is primarily run for contract management.

"These are complex projects – there was no way any of the hospitals could have hoped to have implemented that solution on their own," notes Yundt. "It took us 3.5 years to get SAP running, and another year to get the data cleaned up. Only then can we leverage the advantages."

To date, Yundt says that Plexxus's common information technology platform, which the hospitals share for the supply chain finance function, has saved them upwards of $100 million.

That's significant, and speaks to the advantages of having shared services organization manage a common IT system on behalf of a group of hospitals. But it remains the tip of the iceberg in terms of potential savings.

"Our experience with CPDN is a good indication of where future savings can be found," says Will. "ThoughtSpeed can handle a range of different products, from multiple manufacturers and third party warehouses."

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St. Michael's Hospital refines the use of natural language processing

Branch of computer science makes computerized search tools more effective.

BY KELLY O'BRIEN

If a radiologist wanted to know how many patients at a hospital experienced claustrophobia in an MRI, but who had written on a questionnaire that they weren't claustrophobic, it would be an extremely tedious process.

Radiologists do not use templates or follow a specific structures when dictating reports. Because every report is different, software that works like a search engine for a hospital's radiology information system may not turn up everything if the search isn't sophisticated enough.

"They'll be able to find where the radiologist had dictated, 'Exam cut off because of claustrophobia,' but because one doctor doesn't use the word 'claustrophobia,' and others do, they won't have a complete cohort because they hadn't looked at other ways of dictating claustrophobia," said Kate MacGregor, the quality improvement and radiation protection manager in the Medical Imaging Department at St. Michael's Hospital in Toronto.

To improve the quality of their searches MacGregor and her colleagues are using natural language processing, a branch of computer science concerned with the interactions between computers and human languages.

Natural language processing allows search tools such as Montage, the software used at St. Michael's, to understand human speech as it occurs naturally, both spoken and written, which allows for more accurate search results.

In the past, the type of information gathered using natural language processing, combined with a search tool such as Montage, could have been done only by chart review, said MacGregor.

Now, she said, radiologists have the tools to mine all the data available to them in electronic medical records and the radiology information system, which houses all the reports. "If we wanted to do any of this without Montage, we'd have to go into the electronic medical record and look at each patient to see which ones have pre-conditions or something like that," she said. "So it wasn't possible to do this kind of stuff before. It's pretty amazing when you think about it."

Tools such as Montage have the ability to do a word search using computer science techniques including Boolean logic and exclusion criteria, and filter out what the radiologist wants to see, according to Dr. Bruce Gray, a radiologist in St. Michael's Medical Imaging Department.

"Let's say 1,000 reports have what you want, that's where the natural language processing piece comes in," he said. "We want to create improved algorithms to try and parse out the data, or parse out the text, and try and determine whether there's information or content there that is useful."

Before the radiologists can do anything with the data they find useful, a statistics analysis software programmer must use the patient history to validate the images to ensure the search didn't pick up the terms from different parts of the report and put them together illogically.

"You can search 'rule out appendicitis,' but we're not 100 per cent it matches the understanding of what 'rule out appendicitis' is," said MacGregor. "There might be something that says, 'previous appendicitis, rule out gall bladder,' so it would've combined those words and it wouldn't have been a rule out appendicitis, it would have been a rule out gall bladder."

Dr. Bruce Gray, a radiologist at St. Michael's Hospital in Toronto.

Waste management in hospitals: best practices are evolving

BY DAVID HEEL

For all areas across the healthcare sector, minimizing and eliminating cross-infection ensures a decreased workload in having to treat unnecessary infections. In addition, staff themselves are healthier and require fewer days off sick. For certain patients, such as the elderly or immune-suppressed, effective infection control can be life-saving; it can also result in shorter hospital stays and reduce antibiotic use.

Minimizing the risk of healthcare-acquired infections can therefore directly reduce a healthcare provider's costs, as well as the avoidance of ward shutdowns when an infection cycle needs to be broken.

Selection of disinfection & disposal method: The selection of the disinfection and disposal procedure to be used will always depend on the equipment to be disinfected, and the level of decontamination required (see Table 1 on page 18).

Table 2 shows the microbiocidal activity of chemical disinfectants. There are inherent risks associated with chemical disinfection, however. These include the toxicity of certain chemicals, the resistance of some organisms to the chemicals, and ultimately the risk of instances of human error, where items may not be sufficiently decontaminated.

Due to the increasing number of outbreaks of infections caused by high-risk microorganisms such as C. difficile, and the inability of conventional methods to completely eliminate risk of cross-infection, many global healthcare establishments are now moving away from reusable human waste containers.

These are instead being replaced with single-use 'pulp' containers – which allow for subsequent maceration and disposal of the pulp bedpans – as an alternative and extremely reliable means of 'total infection control'. Macerators will completely destroy both the pulp bedpan and urine bottle container and contents, including 'macerator-friendly' wipes, tissues etc. These items are pulverized into small particles using carefully designed blade technology.

Furthermore, as well as eliminating the potential contamination risk of reusable products, pulp macerators offer much faster cycle times, typically less than two minutes. Moreover, soiled utensils do not need to be emptied or rinsed before being put in to the macerator.

The machines can generally dispose of between two and four bedpans, but, to prevent soiled bedpans from accumulating, the cycle may be started at any time that a utensil is deposited in the macerator. The macerator cycle includes the use of both a high pressure water spray, and cutting blades, which macerate the waste into a fine slurry, which is then flushed into the drainage system.

> **Using low-temperature steam has become a key method of sterilizing reusable items.**

A final spray then cleans and disinfects the interior chamber of the macerator ready for the next use.

Innovative design, low maintenance: The macerator is much simpler in design compared with a washer disinfector, and requires less performance monitoring and maintenance. Equally, macerators use less water and electricity than a washer disinfector. Alongside offering a faster cycle time, they do not use hot water, and are thus not prone to problems associated with lime-scale build up, which is common in hard water areas.

For its part, DDC Dolphin has over 25 years of experience in sluice room solutions and continually seek further advice and guidance from all governing bodies, an approach that we believe enables us to better understand our customers' needs in all areas of the healthcare industry, including the key subject of human waste management.

All DDC Dolphin Pulpmatic macerators have patented hands-free technology, offering operation by means of a foot cup at the base of the machine and an optical hands-free sensor to close and start the

CONTINUED ON PAGE 18

Nurses call for standardized clinical terminology and documentation

BY LYNN M. NAGLE AND PEGGY WHITE

As a healthcare system, we continue to count stuff – procedures, providers, case volumes, and outcomes such as cost, lengths of stay, alternate level of care days, deaths, infection rates. We do not, however, usually turn our gaze to the impact of the efforts and activities of the largest clinician community in the healthcare system, nurses.

There is a lack of awareness among healthcare leaders of the potential value of other standardized clinical data for the purposes of aggregation and comparative analyses within and between care settings.

Nursing is the largest constituency of health providers in Canada. This community includes 293,000 Registered Nurses, 4,400 Nurse Practitioners, 5,800 Registered Practical Nurses, and 11,300 Licensed Practical Nurses.

Nurses are also the predominant users of clinical data and contributors to electronic health records. Recognizing the opportunity to leverage EHR investments and continue realizing the possibilities for improving healthcare delivery through their use, Canadian nurses have begun to develop a national strategy focused on the adoption of data standards.

In April 2016, an invitational symposium was held at the University of Toronto and attended by 60 nurse leaders from across Canada. Sponsored by the Canadian Nurses Association, the Canadian Institute for Health Information and Canada Health Infoway, the symposium focused on the development of clinical practice, administration, education, research, and policy strategies.

The meeting was also supported and attended by a select number of representatives from the vendor community, including Cerner, Orion Health, IBM, Becton-Dickinson, Healthtech, Gevity and HI Next.

Specific actions arising from the symposium included the advancement of a resolution to the Canadian Nurses Association endorsing the adoption of specific data standards in nursing.

It was resolved that the Canadian Nurses Association advocate for the adoption of two standardized, clinical reference terminologies, specifically ICNP® and SNOMED-CT, as well as a standardized approach to nursing documentation in all clinical practice settings across Canada, specifically C-HOBIC and LOINC Nursing Physiologic Assessment Panel.

This resolution was ratified by the CNA Board of Directors in November 2016. Other strategies addressing the adoption of nursing data standards are being operationalized and will be vetted at the next symposium in April 2017.

In particular, tools are being developed to support the integration of data standards into EHR documentation systems and the subsequent use of standardized clinical data to inform practice and administrative decision-making.

Additional details of the 2016 symposium deliberations and recommended next steps can be found in the proceedings, available for download at: https://cna-aiic.ca/on-the-issues/best-nursing/nursing-informatics.

The 2nd national symposium is slated for April 6-8, 2017 and this year an invitation has been extended to more than 100 nursing and health system leaders from every Canadian jurisdiction. Within organizations currently implementing electronic clinical documentation and those replacing legacy systems, there is an emergent energy and interest in continuing to advance the adoption of clinical data standards across the country. This important dialogue will continue to unfold with a clear recognition that there are many benefits to be derived that will inform the future of Canadian nursing and healthcare.

Lynn M. Nagle, PhD, RN, is an assistant professor at the University of Toronto. Peggy White, RN, MN, is Project Director, Canadian Health Outcomes for Better Information and Care.

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Virtual healthcare services, using text and video, are growing steadily in Ontario

Consumer demand for one of the first services, Akira, is growing by 30 percent each month.

BY DIANNE DANIEL

The virtual doctor is not only in, but is also delivering high quality, affordable and convenient care. That's the consensus of early adopters of mobile on-demand services in Ontario that are connecting primary-care physicians, family health teams and mental-health therapists to patients, providing an experience many say is 'Uber-like.'

"To an extent this is 'Press a button, get healthcare,'" says Dustin Walper, CEO of Akira, a privately run mobile telehealth service that provides online access to a team of clinicians to treat low-acuity care issues for a low monthly fee of $10. "But where we try to go in a different direction is we very heavily vet the people we work with ... so it's a much more curated experience than an Uber would be," says Walper.

One of the first providers in Canada to offer a smartphone app than enables consumers to access doctors for ailments such as a rash, the flu or anxiety and depression, Akira has been featured three times in the Apple App Store and reported 25,000 downloads as of February 2017.

Walper says the app's user base is growing at a rate of 30 percent a month and the company is currently investing heavily in Akira for Business, a model designed to entice employers to cover its cost for employees. It is also working to leverage the structured data it collects pertaining to each encounter in its system to better inform clinical decisions, as well as to advance research.

The service emulates a family health-team model, employing nurses, nurse practitioners, physician assistants as well as doctors. It recently added licensed psychotherapists and plans to include pediatricians, dermatologists and dieticians soon.

Patients can renew prescriptions, get sick notes, receive specialist referrals or get lab requisitions. Surprisingly, the majority (70 percent) of patient interactions are conducted via text chats with no video consult required.

"There's a lot of obsession about video in medicine as being the be-all and end-all," says Walper. "The reality is, people don't like video that much and often find it inconvenient. So, wherever possible and where it makes sense, we often provide services via text."

For a population accustomed to in-person, face-to-face consultations with family doctors, the move to virtual healthcare is transformative.

A 2015 Canada Health Infoway survey of patients and physicians in B.C. who used the Medeo virtual care platform, found that 98 percent of respondents described the experience as convenient, time-saving and easy to use, with 95 percent indicating confidence in the privacy and security of their personal information.

A relatively small number – 33 percent – said they felt their visit was limited by not being able to receive a physical exam.

Ontario emergency room physician Dr. Brett Belchetz, CEO of Maple, a 24/7 virtual doctor's office that launched in Ontario in February, says as many as 70 percent of visits to clinical providers for medical issues don't require a hands-on examination.

"It (a virtual visit) is never going to replace your family doctor or hospital ER, but when we look at what percentage of cases really require a swab, what percentage really require a lab test, and what are the cases that need a physical diagnosis, that's only about 30 to 40 percent of cases that walk in the door," he says.

Maple differs from Akira in that patients connect with physicians only. Users can sign up for the service on a smartphone but consultations take place from a desktop or laptop, primarily because mobile web browsers do not adequately support the modern web video and security technologies built into Maple's platform. A native smartphone app is currently being developed and is planned for future release.

"The quality of the patient encounter and the quality of the medicine was the number one priority for us," says Belchetz. "... It made a lot more sense to think about doing this as a desktop app because there are so many more features we can build into it to make it a much richer experience."

Similar to the 'schedule a ride' button in the Uber ride-sharing app, Maple provides a 'see the doctor now' button. Patients describe their symptoms, share relevant history and click to submit the information.

Requests are routed directly to physicians for triage, eliminating the need for a middle person, and response time is typically four minutes. "Even if the only advice you're going to get is that you need to see your family doctor, you're getting a physician reviewing your request and letting you know," he says.

When a consultation is required, users are put in a virtual consultation room that supports audio, text and video. Custom built by Maple, the platform includes an electronic medical record system, digital prescribing and note generation.

The service operates on a pay-per-visit basis priced at $49 per visit on weekdays and $79 per visit on weekends. A $99 per visit fee is charged for after-hours appointments, from midnight to 7:59 a.m., and annual memberships providing unlimited visits are priced at $359 for individuals and $579 for families.

"The best way to think about our technology is it's really like Uber for doctors and patients," says Belchetz. "It's very much an on-demand staffing model."

Dr. Eric Fonberg is a family and emergency physician who is among the first group of subscribed providers to 'see' patients on Maple. When a consult comes in, he is alerted on his cell phone and if he is the first physician to respond, he proceeds to set up a consult on his Apple Macbook.

"It's like an Uber model in that the closest Uber is the person who gets the ride and in this case, the physician who is most available picks up the call," explains Fonberg.

Maple doctors can safely and accurately diagnose the majority of common illnesses, ranging from abrasions, body aches and cough, to ear ache, itchy eyes and skin infection. "I got a call about a little boy who had an unusual cough," describes Dr. Fonberg. "The mom sat the little boy on her lap and I watched his breathing, heard him cough, and I was able to tell her without actually listening to his chest – which wasn't really required – what kind of treatment would be needed."

In its first month, Maple signed on just over 50 doctors and was adding five per week. The virtual care platform is built to scale, relying on the IBM SoftLayer cloud infrastructure to ensure high availability, required to handle a high volume of requests and multiple simultaneous consultations as the service grows.

TranQool is another Toronto-based start-up poised for growth. Focused on delivering on-demand mental health services – primarily to young professionals and university students – the company is on a mission to make mental health services accessible and affordable, eliminating current bottlenecks and making it easier for patients to navigate Canada's mental health resources.

"When it comes to 'Ubering' of our healthcare system ... it doesn't necessarily mean that if I need to talk to someone I should take my phone out of my pocket and get immediate access," says co-founder and CEO Chakameh Shafii, a mechanical engineer who was inspired to launch TranQool following her own experience with anxiety as a student.

"The challenge we had to solve was how to create that feeling of your therapist is going to be at your fingertips, but at the same time give the sense that this is a legitimate platform with legitimate research behind why video therapy works."

Similar to Maple, TranQool delivered a web-based desktop application first, with a smartphone app expected to be available this year. Android phone users can sign in using the latest release of Google Chrome or Firefox for Android.

One of the company's core strengths is its matching system which makes clinician recommendations based on information provided by patients. After viewing the profiles of their 'matches,' patients select

ILLUSTRATION: LINDA WEISS

the clinician they feel most comfortable with and proceed to book and pay for an appointment, according to the availability shown in that clinician's schedule. "When it's time for your session, you log back in and click on start session," explains Shafii.

The secure, one-to-one online video counselling sessions are hosted in a redundant server environment to ensure the software's availability. TranQool developers made privacy and security a top priority, working with privacy-by-design advisors to comply with Canada's stringent privacy legislation. Sessions are held with accredited counsellors who are trained in cognitive behavioural therapy, an evidence-based approach to treating a wider variety of mental disorders that is shown to be equally as helpful as medications.

"These are psychologists and social workers who are working for less than half of what they make for an in-person session," stresses Shafii, noting that TranQool fees are $120 for a 45-minute session with a psychologist or $80 for a social worker. "We've just enabled them to increase the number of people they can help."

Gita Canaran is a London, Ont.-based clinical psychologist using TranQool in her private practice to treat six to eight patients per week from her Windows laptop. She says patients are quite relaxed speaking with her via video and the 45-minute sessions are extremely productive. The service is particularly effective for one clients who experience high anxiety who can now receive therapy from the comfort of home, and has the added overall benefit of reducing social anxiety longer term.

"When you're doing cognitive behavioural therapy in an office, that office becomes a safe place for you, a place you look forward to going to," explains Shafii. "When you're doing this at home or at your office or in a library at school, then what ends up happening is everyday places you live in become those safe places for you."

The more that consumer-based, virtual services like Akira, Maple and TranQool catch on, the more they are debated. Some critics claim fee-based services enable patients who can afford it to "jump the waiting line," while others worry that virtual visits aren't attached to a patient's primary caregiver and could therefore disrupt continuity of care.

Then there's the question of physician reimbursement and whether or not there's room for virtual care services to be supported in a publicly funded system.

Maple's Belchetz says a large percentage of early Maple users are hourly wage earners who don't have benefits and prefer paying an affordable fee to see a doctor from the convenience of home versus taking time off work or paying to travel or park. Many visits are for follow-up information, prescription renewal or basic diagnoses, cases he says can easily be brought into the community, alleviating some of the burden on hospitals and walk-in clinics.

"The idea is never to replace the healthcare system but to add to it," he says.

Maple and Akira have expended a great deal of effort to include a digital medical record as part of the service they provide and maintain that patients should be the custodians of that information. Both Belchetz and Walper envision a future where virtual care becomes part of the publicly funded system, including in-practice use by primary caregivers. This summer, the Ontario Telemedicine Network (OTN) is planning to launch a pilot project to demonstrate how it might work.

OTN chief executive officer Ed Brown says technology is the least of the problems. "The technology (to support on-demand services) is so available and so simple," he says. "The hard part is the workflow to provide holistic care."

The goal of the pilot, which issued an open request for proposal to all virtual care platform providers, is to enable patients to send online requests and receive same day clinical advice as a starting point, providing video consults with a primary caregiver as needed. Brown says there's a great willingness among primary caregivers to move forward with virtual care as an opportunity to deliver good healthcare conveniently.

"This is the new standard," adds Maple's Belchetz. "Every time I treat a patient on Maple, I think 'Wow! This is a patient who didn't sit in a waiting room, who didn't take up a space in a walk-in clinic.' Right now, these are dollars the government didn't have to spend."

CellTrak puts the right technology in the right hands to deliver patient-centred care

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–Sharon Goodwin, VON Canada's Senior Vice President of Home and Community Care

Learn how VON Canada gained a 25% increase in caregiver productivity with CellTrak at www.celltrak.com/webcasts.

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Care at your fingertips: The expanding power of remote patient management

BY MARTIN TRÉPANIER

Quebec is an early adopter of Remote Patient Monitoring, having used remote personalized care for almost 15 years. In 2015, the province chose Orion Health's RPM platform for widespread use. In the first year, more than 1,500 patients were managed on the program and preliminary results are excellent.

Patient satisfaction is at 90 percent, which reflects the readiness of the patient to use such tools. When patients adopt a prescribed treatment plan, these empowered patients take part in care decision-making, which results in better and more sustainable patient outcomes.

For patients living with a chronic condition, every day can be a challenge. As those with chronic diseases or conditions understand, treatment is less about curing a disease and more about learning to live with it – a feat that can be challenging without sacrificing an independent and fulfilling life.

Fortunately, solutions like Remote Patient Management (RPM) have eased the lifestyle shifts that chronic diseases can encumber. In one case, a Quebec patient put on an RPM program last year was able to get back into running multiple times a week – despite the fact he had stopped physical exercise for many years due to his illness.

Martin Trépanier

This patient was not cured by the program. However, he learned how to live with his chronic condition more easily. While not all patients will end up with such an extraordinary outcome, the empowerment and sense of security that comes from an RPM program can improve a patient's health status and quality of life.

RPM is the personal health assistant, elevating patients and family-caregivers' expertise effortlessly through interactive daily health activities. It fosters empowerment and improves a user's sense of security about their condition.

This is because they can manage their health independently, reacting quickly to symptoms and thereby avoiding unnecessary ED visits. Simultaneously, patients have direct access to care providers should the need arise.

Furthermore, although patients with chronic conditions are often primary targets, services delivered through RPM are expanding. Value services such as pre- and post-surgery monitoring, high-risk pregnancy, oncology, etc., are generating excellent outcomes for patients and value for healthcare administrators.

At this point, it's hard to doubt the benefits of RPM, so the real question is: "Can healthcare organizations integrate this tool widely in conventional care processes?"

The first consideration must be the solution's ability to exchange information with external systems. Interoperability is important considering most patients targeted by RPM programs have complex chronic diseases with information in several systems.

As well, self on-boarding processes and simplicity of use is important so that patients can become familiar with RPM at their own pace, on their own time. In short, simplification of logistics and reduced costs surrounding patient support, facilitates mainstream deployment and improves ROI.

As the Certified Professional in Healthcare Information & Management Systems (CPHIMS) handbook states, "Sustainability (of our healthcare system) is most likely to be achieved by effectively engaging patients as active participants in managing their own health," which is precisely what RPM does.

RPM is a solution that balances better patient outcomes while significantly lowering the costs of complex chronic patients. And patients are now demanding it.

Martin Trépanier, is Director, Québec, for Orion Health.

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VON Canada's mobile solution has increased productivity by 25 percent

At VON Canada, 6,400 staff and 6,200 volunteers bring a wide range of nursing, personal support, and community services to more than 10,000 people every day in Ontario and Nova Scotia.

Delivering exceptional patient care is paramount to the organization, and VON Canada needed a more effective and efficient way to coordinate home care and ensure secure communication in the field.

If field staff couldn't get real-time answers to patient care questions or didn't feel tightly connected with the central planning team, care quality could be impacted and service levels could be missed.

Adding to these challenges was the need to address ever-changing regulations and funding requirements.

Sharon Goodwin, Senior Vice President of Home and Community Care, said, "Our manual field processes were no longer working for us and were resulting in service issues. We needed to automate some of the work to improve delivery of care."

The organization needed a technology solution that would facilitate communication, increase efficiency, and improve documentation accuracy and workflow automation.

If it could do all that and reduce administrative costs, all the better.

VON Canada started by bringing in frontline personnel to identify all of the organization's operational processes, in order to identify opportunities to better connect management, staff, and patients.

Mapping these processes brought important insights to light: from the moment a client referral came in, it took 169 distinct steps to get field staff to that client's home.

It became clear that automation would need to play a key role in any solution. Additionally, the solution would need to integrate with their back-office software system.

CellTrak's Care Delivery Management solution provided everything VON Canada needed.

It would allow the organization to better manage frontline staff; connect staff with patients; and automate processes to improve compliance, communication, care, and cost.

And it is integrated with their existing software, providing seamless back-office operations.

But that didn't mean execution would be easy. As often happens when implementing new software, several complex integration and change management issues arose that required expert attention.

CellTrak and VON worked closely to address and overcome those issues and leverage the Care Delivery Management solution to help VON improve client care.

Using CellTrak is part of the solution that has allowed VON Canada to increase productivity by 25 percent and reduce mileage expenses by up to 15 percent. By strengthening their service strategy, VON Canada is now fully equipped to implement a metrics-based approach to managing its staff and resolving problems before they become missed opportunities.

Combining automated workflows with an improved service chain has redesigned the way work is done and has helped staff connect with each other.

They're communicating better, faster, more securely, and more often – and they can update documentation in real-time instead of calling in.

"Using the CellTrak solution has made connecting field staff with patients easier. We gained a new understanding of where people are and what they're doing. This has helped us provide the right care at the right time," Goodwin said.

Moreover, the steps involved in servicing new clients have decreased dramatically.

"Since connecting people in the service chain and automating some of our processes with CellTrak, we reduced that number to around 50," noted Goodwin. As a result, each staff member now has the time to see one additional client per day.

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Waste Management

CONTINUED FROM PAGE 12

machine. They also have the latest antimicrobial materials in their lid construction and offer automatic disinfection of the internal chamber post maceration, all features which help to greatly reduce the risk of cross contamination.

The efficient operation of Pulpmatic macerators translates into significant savings in terms of staff time, water and electrical consumption.

Bedpan washer disinfecters: Using low temperature steam has become a key methodology for decontaminating reusable items within sluice rooms. Washer disinfecters that use thermal disinfection are now an essential element for emptying, washing, and disinfecting metal or plastic reusable human waste containers, such as bedpans, commode pots, and urine bottles.

The washer disinfector cycle first flushes waste from the container placed in a racking system within the chamber to remove visible contents, with a steam generator heating to a minimum of 80°C for at least one minute to ensure that all proteins are denatured. The heat acts to completely disinfect the container, as well as the machine chamber.

It should be noted, however, that such steam disinfection is not sufficient to destroy C. difficile spores.

Advances in washer disinfector technology: DDC Dolphin offers washer disinfecters which are designed to clean and disinfect urinals, reusable plastic and stainless steel bedpans and other accessories. A great advance in sluice room technology, they are designed to automate the entire process, and to eliminate the need to empty the bedpan contents before loading.

The new generation of washer disinfecters are both reliable and affordable, with the more recent models incorporating antimicrobial materials and hands-free technology to open, close, and operate the machines which ensure the highest standards of hygiene and efficiency, greatly reducing the risk of cross-contamination.

Thermal disinfection systems, as used in washer disinfecters, provide heat using steam to a fixed temperature for a specified time to deactivate the infectious elements. This is achieved using the application of moist heat, (steam) at ambient pressure to an Ao of 60, equating to 60 seconds at 80°C. The continuous monitoring and recording of the temperature and time are critical to ensure that the required temperature level is achieved.

Government standard testing and validation procedures should be carried out on a regular basis weekly, quarterly, or annually, depending on the checks required.

Table 1- Microbial activity of decontamination methods

Action	Spores	Microbacteria	Bacteria	Viruses
Disinfection				
Thermal washer-disinfector	☒	✓✓✓	✓✓✓	✓✓
Low temperature steam	☒	✓✓✓	✓✓✓	✓✓
Chemical disinfectant	See Table 2			
Sterilisation				
Steam	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Dry heat	✓	✓	✓	✓
Gas plasma	✓✓✓	✓✓✓	✓✓✓	✓✓✓

☒ None ✓ Poor ✓✓Moderate ✓✓✓Good

Table 2 - Microbicidal activity of chemical disinfectants

Disinfectant	Spores	Microbacteria	Bacteria	Viruses
Alcohol	✓	✓✓	✓✓✓	✓✓
Ortho-phthalaldehyde[1]	✓*	✓✓✓	✓✓✓	✓✓✓
Other aldehydes**.[1]	✓*	✓✓✓	✓✓✓	✓✓✓
Chlorine dioxide	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Peracetic acid**	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Other peroxygen compounds**	☒	✓	✓✓✓	✓✓
QACs**	☒	✓✓	✓✓	✓✓✓
Superoxidised saline	✓	✓✓✓	✓✓✓	✓✓✓

☒ None ✓ Poor ✓✓Moderate ✓✓✓Good

Scale and disinfectants: The steam generator in a bedpan washer generates temperatures that may produce heavy scale deposits; thus in areas where hard water is not treated, the scale build-up may hinder its operation.

Most machines come with an inherent de-scaler system, but although this helps, it is recommended that in hard water areas a detergent with additional de-scaler is used to maintain machine performance. Some detergents can pose a threat to the wider environment, but modern disinfectants such as DDC Dolphin's EcoWash+ and EcoWash+ Ultimate for hard water areas contain some caustic alkali, which is neutralized by other ingredients in the effluent water.

They do not contain DDAC (a carcinogen), and the surfactants are all biodegradable to EEC guidelines. Mechanically the washer disinfector is a complex machine, so a service and maintenance plan should be considered to avoid unnecessary costly machine failures.

Conclusion: Whether you chose a macerator or washer disinfector, there are certain key features of DDC Dolphin machines considered desirable for increased contamination control and ease of use.

For example, hands-free operation, and the incorporation of antibacterial materials in contact areas to create a 'microbe-safe' surface, are highly recommended to help reduce cross-contamination. Reduced water consumption is also advantageous for conservation of water, particularly in areas where water is a valuable commodity, and of course reduced power use both helps the environment and keeps costs to a minimum.

Inadequate decontamination and disposal of human waste can result in the transfer of infection to patients and healthcare workers.

The choice of equipment involves many considerations: regulations, the number of patients, size of room, equipment, and budgets, but it is an important and essential consideration for all healthcare environments.

David Heel is Business Development Director for DDC Dolphin Canada, specialists in sluice room and dirty utility room design and manufacture.

SMArTVIEW project ready to go live

CONTINUED FROM PAGE 9

that specializes in cardiac and vascular surgeries and sees a high volume of patients. It is also associated with Coventry University, where researchers have devised tools for support patient self-management during recovery. This expertise is being incorporated into the SMArTVIEW software.

"It was a natural fit to work with them," said Scott.

Overall, the home monitoring system will track many data-points. It will give clinicians a clear idea of the patients who are at greatest risk of developing complications, such as infections.

"We can then increase the monitoring or make the appropriate intervention," said Scott.

Patients will be trained in self-care, too, so they can take better care of themselves and improve outcomes. The SMArTVIEW system includes an easy-to-use interface on that tablet for self-care, including goals for the patient.

Social media is another component of the project; it will enable patients to chat with each other and learn from their shared experiences. "We believe there is an important role for peer-to-peer learning," said Scott.

Some patients, he expects, will become 'champions' who take an active role in teaching others about self-care and the use of the technology.

SMArTVIEW is a large project – the development team includes more than 100 scientists and clinicians working at Hamilton Health Sciences, Liverpool Heart and Chest Hospital, McMaster University, Coventry University, Mohawk College, the University of Toronto and York University.

As well, the Institute for Clinical Evaluation Sciences (ICES) will be determining how effective the project turns out to be, measuring the expected drop in re-admissions and its effect of hospital costs.

Zebra Technologies offers new smartphone and scanner

HOLTSVILLE, N.Y. – Zebra Technologies Corporation, a global leader in providing solutions that give enterprises real-time visibility into their operations, announced two new mobile handheld devices that will improve clinical mobility workflows and patient care.

The DS8100-HC series scanners and the durable TC51-HC mobile computer can foster clinical collaboration for staffers and drive better operational efficiencies, while also supporting the five rights of medication administration to help increase patient safety.

The DS8100-HC imager series, which comes in both corded (DS8108-HC) and cordless (DS8178-HC) versions, feature a purpose-built housing using special plastics to help prevent the spread of bacteria and allow for safe wipe-downs with a wide selection of disinfectants used in hospitals.

The DS8100-HC series features user-selectable feedback modes to instantly notify healthcare workers that a barcode was properly captured without disturbing patients. In addition to standard LED, vibrate and beeper feedback, users can individually or in any combination easily adjust beeper volume, frequency and illumination intensity to improve the patient experience.

Both the DS8100-HC series and the TC51-HC mobile computer can capture virtually any barcode in any condition and scan the most problematic barcodes found in pharmacies, labs, and at the point of care to help improve productivity and efficiency.

Healthcare providers can rely on the TC51-HC mobile computer with Android to replace multiple devices needed to perform tasks such as calling/texting co-workers, receiving calls via PBX, accessing patient records, scanning barcodes and increasing medication administration accuracy.

An ultra-high resolution rear-facing camera and a front-facing camera enable healthcare professionals using the TC51-HC to provide an intricate account of their patients' conditions and to offer remote consultations for quicker service.

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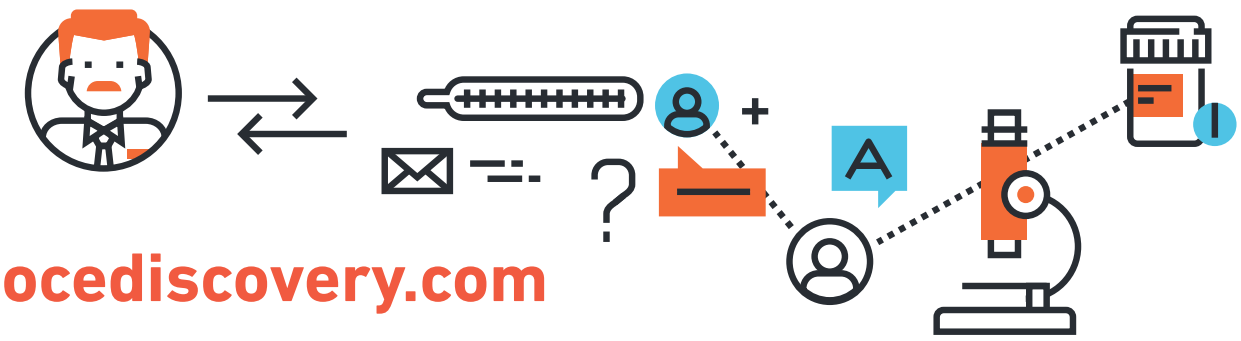

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