FEATURE REPORT: ELECTRONIC HEALTH RECORDS — SEE PAGE 18

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INSIDE:

PHOTO: ONTARIO SHORES

Ontario Shores develops new mental health app

Ontario Shores Centre for Mental Health Sciences, in Whitby, Ont., has produced an app that enables patients to easily access their records and to contribute data to their own charts. The app encourages patients to become full partners in their recoveries and the management of their healthcare. Pictured above are team members, including Ontario Shores CEO Karim Mamdani (fourth from left). SEE STORY ON PAGE 4.

myUHN gives patients real-time access to health records

BY JERRY ZEIDENBERG

TORONTO – The University Health Network is steadily rolling out its myUHN Patient Portal to all patients at the organization's four hospitals – Toronto General, Toronto Western, Princess Margaret Cancer Centre and the Toronto Rehab Institute. Unlike many other portals, test results and other information are posted as soon as they are available, giving patients their results in real-time.

"My patients are seeing their results even before I do," said Dr. Richard Tsang, a radiation oncologist at UHN. But he said that's a good development, because patients want their results as soon as possible.

As well, it can save them a lot of time and trouble. "We don't want them coming in just for test results," he said.

Patients can also check their appointments online, and the system will send them reminders. "We've reduced the number of no-shows because of this feature," said Dr. Tsang.

Dr. Tsang and his colleagues in the radiation oncology clinic were among early adopters of myUHN. The hospital designed its portal in-house over the past several years, testing it at seven different clinics at Toronto General and Princess Margaret.

Now, uptake of the portal is really taking off. Since the rollout at the end of January, patients have been signing up at a rate of 1,000 per week. "And we've only scratched the surface," said Selina Brudnicki, Program Lead with UHN Digital, explaining that the hospital is now making the portal available to all of the hospital's various clinics and inpatient units. "It's a gradual rollout, as we encourage staff to offer and talk about the portal as part of the patient visit."

> **So far, there is a 45 percent adoption rate among patients who have been offered access.**

The strategy has definitely paid off, as there is a 45 percent adoption rate among patients who are offered access to the portal. They're not just signing up and forgetting about the portal – UHN has observed 82 percent of them returning to the portal each month.

Usage could reach very high numbers, as UHN sees more than 250,000 out-patients per year.

Laura Williams, Director of Patient Engagement, noted that many users of the system were not regular users of the Internet, but the ability to access their health information through the portal spurred them to get online. "While using online technology is still a barrier for some, it is encouraging to see so many non-traditional users taking part," she said.

Williams added that patients can also give family members and caregivers access to their health information, as they are often an important part of the care team. Signifi-

CONTINUED ON PAGE 2

myUHN portal gives patients real-time access to their health records

CONTINUED FROM PAGE 1

cantly, patients can specify which kinds of information each caregiver can access.

myUHN is one of the first patient portals in Canada offering real-time access to results, reports and clinic notes. Patients will even see pathology reports, physician and mental health notes.

Other hospitals often limit access to sensitive information, or delay posting them in their portals.

Surveys showed that patients wanted full access to this information; they also wanted quick access to their test results, diagnostic imaging reports and pathology reports.

"The majority want to see their results as soon as they are ready, even before talking to the doctor, which led to our decision for real-time access," said Brudnicki.

"From a patient perspective, this is a big issue, just for my own mental health," said Carrie Orfus Gelkopf, an oncology patient who is being treated at Princess Margaret. "There is a ton of anxiety from not knowing."

Using myUHN, she has been able to gain fast access to test results and reports; she has also developed the expertise to interpret some of them on her own.

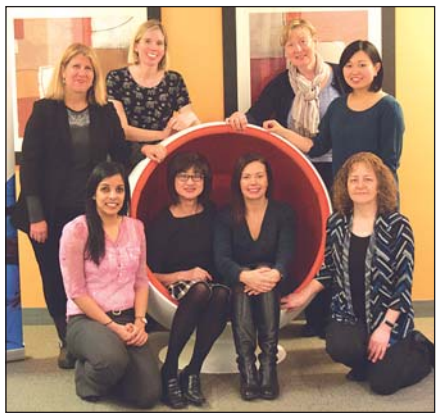
Many organizations have trouble with this idea, and feel that patients won't be able to properly understand test results or records. The feeling has been, at least in the past, that patients don't have the knowledge or skills to properly absorb the information, or will react poorly to negative test results when left on their own.

For its part, UHN debated this issue internally and decided that patients should be enabled to access their information in real-time. With guidance and support, all patients should be included as full participants in their care.

"We did have some anxiety about this originally," said Dr. Tsang. "But we learned that we could pre-empt any problems by teaching the patients how X-rays and other results are properly interpreted."

Patients can also be coached about the meaning of results before receiving them – if a test is scheduled, the physician can instruct the patient about the possible outcomes, so that he or she is prepared.

Having full access to charts and reports also enables patients to better understand their illnesses. Too often, in the doctor's office, they are flooded with information of which they retain only a portion. When they go home, they can go online, see their records and results in myUHN, and gain a fuller understanding of all of the details.



Team members of the myUHN patient portal.

"When I see my doctor, he may tell me eight different things, and I can only remember two of them afterwards," said Gelkopf. "The portal lets me go back later and see it all again."

Armed with all of the information, patients can better discuss their conditions with family and their own caregivers.

"The patient is an expert, and a key partner, in their own care," commented Dr. David Jaffray, Executive VP of Technology and Innovation at UHN. "We need to support this reality."

"We believe the healthcare system is moving toward democratization," added Dr. Peter Pisters, President and CEO of UHN. He noted that many patients are already actively researching their illnesses on the web and are also members of online forums.

"Many of them already have access to sophisticated sources of knowledge," he said.

So, at UHN, the decision has been made to move away from a provider-centric model towards consumer-driven healthcare. "Patients used to be given information on a 'need to know' basis," said Dr. Pisters. "That model is dead. We want to empower our patients."

Instead, at UHN, patients are being given full access to their information as soon as it is available.

Dr. Pisters said that every organization that's done this has improved its medical outcomes. They have also enhanced the satisfaction of patients and reduced their anxiety. As well, he said, the clinicians who are involved have been pleasantly surprised by how well it works.

As an example of how care is improved by sharing records with patients, Dr. Pisters noted that patients will often correct mistakes they see in their charts. "If there are mistakes made about allergies, or other issues, and the patient calls us to correct them, that benefits everybody," he said.

"Patients want to be empowered with access to their own health information to understand and partner in their health," added Joy Richards, Vice President, Patient Experience and Chief Health Professions. "And they want greater control in deciding when and how they access information."

The University Health Network built myUHN with its own team of information technology professionals, working in conjunction with clinicians, administrators and a patient committee.

There are other portals available for use by hospitals, but UHN wanted to keep the development in-house. "We want to be in control of our digital doorstep," said Dr. Jaffray. "The portal is really a critical component of the digital patient experience – a major part of how we will support our patients and their families going forward."

He said that UHN is innovating in many areas, and will be bringing these innovations to its portal as they validate their functionality and benefit.

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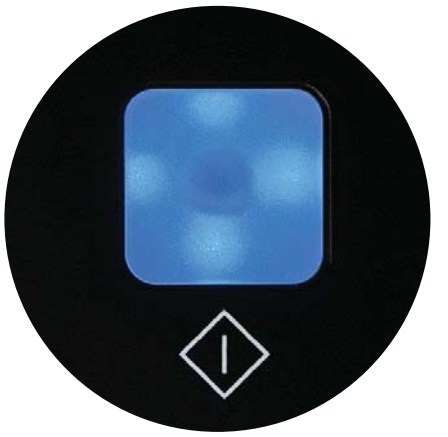

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Workflow software helps automate Pulmonary Function reporting

BY ANDY SHAW

Respirologists at Toronto's St. Michael's Hospital are breathing easier these days. They've deployed software from Influx Workflow Solutions, which extracts patient data from a wide array of cardiology and respirology diagnostic devices and consolidates it all in a single structured report. The reports can then be easily viewed by respirologists, cardiologists, referring physicians and other caregivers – easily and quickly.

"In our Pulmonary Function Lab, we do a wide range of diagnostic tests including spirometry, lung volumes, lung diffusing capacity, airway resistance and exercise oximetry among others," says respiratory therapist Eva Leek. "In the past, both our staff and physicians have had to go to each machine to create their reports. Now, we can gather all reports from just one workspace and see a complete view of the patient's respiratory status."

All this inconvenience made for a respiratory workflow that was slow and prone to error. While preliminary reports might be in clinical hands within a day, full diagnostic reports sent back to referring physicians could take a week or more

Moreover, any errors made, human or otherwise, created their own nightmares, says Leek: "It was not easy to fix a mistake – even something as simple as a work order error. That meant we had to dig into the depths of the medical record system and remove the mistakes one by one, a very tedious task."

"In short, we did not have a very efficient set-up," says Dr. Marie Faughnan, a respirologist and associate scientist who is in charge of St. Michael's respiratory lab.

Eva Leek, respiratory therapist, and Dr. Marie Faughnan, respirologist, are helping to deploy the new software.

Adding to the workflow challenges at St. Michael's are two other complications, says Dr. Faughnan: "We do a lot of work here in infectious diseases, which requires separate labs, so that added to our workflow and control problems. Also, we are a teaching hospital. So our workflow has extra steps in it to accommodate our training responsibilities.

"Here for instance, a report goes from the respirologist to the doctor, of course, but then he or she then passes it on to the student resident for review and a teaching-moment discussion with the doctor. Then it goes back to the doctor, before the report is finally sent out. We needed a system that was very user-friendly and made reports very easy to interpret."

And one that would also work fast, very fast, with integration to the patient's electronic health record

Luckily, a generous hospital donor put up $75,000 towards the capital expenditure for a system that could deal with St. Mike's respiratory complexities and unique needs.

"That donation was the catalyst that really got us going," says Dr. Faughnan.

So, the hunt was on to find a solution, if it existed at all.

"We selected five vendors from our RFP responses and made site visits to them all. We did that because we realized we needed something really sophisticated," explains Dr. Faughnan. "We weren't looking for just machines; we were looking for people we could work with and help us develop that level of sophistication."

Ironically, part of the solution that Dr. Faughnan and her team endorsed had already been at work in St. Michael's own backyard.

The Canadian company that won the RFP, Roxon Medi-tech, specializes in supplying cardiac, respiratory and neurology equipment to hospitals. Most importantly, Roxon was also a partner with a start-up company called Influx Workflow Solutions, and its innovative multi-diagnostic reporting software.

"The proposed solution consisted of two components: the Influx workflow application for diagnostic reporting and a cardiology PACS system which was already in being used in the St. Michael's cardiology department" says Rajesh Sharma, the chief operating officer for Influx.

Influx's own roots are in cardiology. Corcare, a three-clinic cardiac and nuclear medicine practice in Toronto, developed Cardiology Workflow, Influx's first product. Like Respiratory Workflow, it too embodies Lean management principles in its software to tap a variety of imaging sources including: echocardiogram, EKG, stress, Holter, and nuclear imaging devices.

"Our product is workflow", says Sharma. "By incorporating Lean principles to our software, we have been able to automate the capture and interpretation of complex clinical data into a clear and concise reporting workflow process."

Therapists performing the study can

CONTINUED ON PAGE 22

New app encourages patients to become more active in their own care

WHITBY, ONT. – Patients at Ontario Shores Centre for Mental Health Sciences will become more active participants in their own healthcare through the use of a new app developed with a partner company, Waterloo, Ont.-based Mozzaz Corp.

The app, which runs on tablets and smartphones, has been integrated with the hospital's Meditech electronic health record solution, so that patients can help update their own records.

"Along with the ability to enter scheduled self-assessment forms and access reminders for medications, patients can access the Ontario Shores patient portal, tip sheets, assessment tools and other resources in one location," said Karim Mamdani, president and CEO at Ontario Shores.

"It's completely integrated with the Ontario Shores electronic medical record, meaning patients are contributing directly to their own records."

The app has the ability to connect to wearables and other devices, so that data could be automatically upload information into the patient's electronic chart.

"Control of healthcare is rightfully shifting from the provider to patients," said Mamdani. "At Ontario Shores, we like to tell patients that they are the experts in their own care."

So the app lets patients check on information in their own charts, such as lab and test results, appointments, medication lists, progress reports and clinical histories.

And they can use Mozzaz to interact with their care teams in-between appointments through their mobile devices.

It's all part of the movement to empower patients, who tend to do much better when they have ready access to their own clinical information and feel in charge of their care.

"The goal is to encourage patients to take an active role in their treatment plans and in their individual care," said Rini Gahir, co-founder and chief business development officer at Mozzaz.

For clinicians, use of the app is expected to be a big time-saver, as they will be able to quickly review the information that has been uploaded by patients instead of laboriously asking question after question during encounters.

"It helps eliminate manual entry for the clinician, which helps to increase clinician productivity and efficiency," said Gahir.

It will save time and trouble for patients, too, as they won't have to repeat the same information when seeing different clinicians.

Gahir noted that about 60 patients in four different groups are already using the app at Ontario Shores. The groups are: eating disorders, transitional-aged youth, geriatrics and neuropsychiatry.

"They all have very different kinds of care plans," said Gahir. He expects the numbers of patients and groups to steadily increase.

> **Patients do much better when they have access to their information and feel in charge of their care.**

The use of the app so far is just the tip of the iceberg, he said, as in the future many new and different devices may be connected to the system. That will provide care teams with even more information.

"We believe that information collected in this way can help with interventions," Gahir suggested, "leading to greater safety, stability and better health."

Partners at the University of Ottawa and the University of Toronto will be evaluating the project to determine the effectiveness of the solution.

For its part, Mozzaz works with over 40 different healthcare organizations in Canada and the United States. In the U.S., the company is also providing solutions in areas such as autism, suicide prevention and family and child services.

Ontario Shores has been a leader in the application of technology to patient care. It was the first hospital in Canada to achieve the HIMSS EMRAM Stage 7 certification, and the first mental health hospital in the world to reach this level.

Recently, it has been working with the Ontario Telemedicine Network (OTN), Lakeridge Health and Women's College Hospital on a solution called Big White Wall. BWW provides online community support, 24 hours a day, for people feeling anxious or depressed, or having trouble coping with other mental health-related issues.

Mamdani said that, "Thinking and doing differently is not easy – in healthcare, we can often feel grounded by history and traditional thinking. However, innovation and technology are changing the world. And the way we deliver mental health is changing along with it."

Three Ontario hospitals announce plans to share patient record system

BY JERRY ZEIDENBERG

Three Ontario hospitals recently announced they are joining hands to share an implementation of Meditech's latest electronic medical records system, called the Meditech Web EHR.

Markham Stouffville Hospital, in Markham, Ont., will host the system, and a single, shareable electronic health record will be created for patients at Markham Stouffville, Southlake Regional Health Centre, in Newmarket, Ont., and the Stevenson Memorial Hospital, in Alliston, Ont.

The new project is being called SHINE – short for Shared Health Information Network Exchange.

It's the first group of hospitals to take a cue from the Ontario government's new eHealth 2.0 strategy, which encourages hospitals to create geographical clusters that can share computerized systems as a way of reducing costs.

"There are substantial savings," said Tim Pemberton, chief technology officer at Southlake. He noted that Markham Stouffville, which has been a long-time Meditech customer, was footing 100 percent of the bill for its own electronic health records system. Now that it has partners, it will bear only part of the cost of the shared solution.

For its part, Southlake is the biggest of the three hospitals in the partnership and will shoulder the largest portion of the costs. Pemberton noted the exact shares are still being worked out.

While there are other groups of hospitals in Ontario that are sharing Meditech software, Pemberton believes this will be the first time the partners will create a single record for all patients.

The goal is to have SHINE up and running in early 2018. Meanwhile, work is being done to prepare for the implementation, such as creating a master patient index and the merging and purging records of patients. Many of the patients in the region visit two or more of the partner hospitals, so information from their records must be consolidated.

"There are about 2 million patient records," said Pemberton. "It's a lot of work."

Southlake was in the position of needing a new electronic patient record system, as it currently uses a McKesson solution that will reach sunset in 2018 – McKesson has told hospitals it is leaving the electronic health records marketplace in Canada. Sharing the Meditech Web EHR with Markham Stouffville seemed like a logical thing to do, as so many of the region's patients visit both hospitals.

Southlake is regional centre for cancer care and has expertise in cardiology and many other areas. As a result, it attracts referrals from Markham Stouffville, Stevenson Memorial and from physicians in a wide catchment area.

It's the first time in Ontario that a group of hospitals will create a shared Meditech record for each patient.

By having a single patient record available, clinicians will get a more complete view of the patients' medication histories and lab results, as the information will be merged from all three hospitals.

And while Meditech is sometimes thought of as an old-fashioned system, Pemberton is quick to observe that the latest, web-enabled version is unlike anything the company has produced before. "This is not your father's Meditech," quipped Pemberton. "This system is a game-changer."

He noted that clinicians from the hospitals were impressed by a demonstration of the web-enabled Meditech. Everything can be done on a tablet or smartphone, and the system automatically detects what kind of device the user has – desktop, tablet or phone.

Moreover, the system handles all of the hospital workflows, including Emergency Department, inpatient, surgical and discharge – all from portable platforms as well as from desktops.

"It's all mobile," said Pemberton. "The clinicians were blown away."

Meditech's associate VP of marketing, Christine Parent, said the company has realized that doctors and nurses today are not tethered to desks. "It's a new generation and they're mobile. They need information at the point-of-care."

For that reason, the Meditech Web EHR is designed to be used wirelessly, on a variety of platforms. "It allows you to roam," said Parent.

Southlake and Stevenson will be able to leverage the expertise of Markham Stouffville, which has already achieved Stage 6 in the HIMSS EMRAM framework.

"We will share our Meditech knowledge with them," said Lewis Hooper, CIO of Markham Stouffville, adding that MSH will also make resources like data dictionaries and other tools available.

"But we will also benefit from having partners, too," he said, noting that Southlake has a large number of order sets that could be used on the road to implementing a Computerized Physician Order Entry (CPOE) system, something that's in the works at both organizations.

Hooper said that Markham Stouffville will also learn from the Stevenson Memorial, a smaller hospital where clinicians and staff have learned to accomplish a lot with fewer resources. One person will often do a lot of things, and they've learned to do them very efficiently, Hooper asserted.

Calling them "specializing non-specialists," Hooper said there's a good deal of knowledge about efficient and effective practices that can be learned from Stevenson Memorial.

On the technological side, Hooper asserted that a shared EMR will make things easier and faster for clinicians and patients. Not only will more information be available at the touch of a few buttons, but the processes for reaching the data will be the same across all facilities – meaning that clinicians going from one site to another will know how to obtain the information without re-training.

And with everyone working on Meditech, the organizations will be able to develop more expertise in the technology – which can be shared among partners.

For its part, Southlake intends to reach HIMSS Stage 6 by the year 2020. To that end, it has also been investing in more powerful infrastructure, including a 100 gigabit/second wired network, using Cisco technology, and 10 gigabit/second wireless.

"This is all to support the HIS," said Pemberton.

The hospital is also using Microsoft's Office 365, with Skype, through the cloud. And it has implemented virtual desktops and proximity card log-ins that allow clinicians to roam from one computer to another with automatic logins and logouts.

The partners plan to deploy the patient portal component that is part of Meditech Web EHR. "It's part of our strategy to engage our patients," said Pemberton. He noted the system offers features like appointment scheduling, prescription renewals and an interface for contacting physicians and other clinicians.

The hospitals are still in the planning stages, however, about which of the features to provide. "We'll see what the patients want," said Pemberton.

Meditech is a major supplier of electronic record systems in Canada. Parent said the company does business in seven of the 10 provinces, and in two of the three territories. It has a 50 percent market share in Ontario's acute care hospitals, and 41 percent in Canada as a whole.

She noted there is a great deal of interest in the project launched by Markham Stouffville, Southlake Regional and Stevenson Memorial. "A lot of institutions are watching this," she said. "They want to learn from it."

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Precision medicine: healthcare systems must learn to provide solutions

BY JOEL DIAMOND, M.D.

As physicians, we want to offer the best possible care plan for every patient, every time. We want tools that help us incorporate the many factors that affect each individual. This is where precision medicine comes in.

Precision medicine is an emerging approach to treat and prevent disease that considers individual variability in genes, environment and lifestyle for each person.

The good news for patients today is that healthcare is overcoming some of the challenges that have kept precision medicine from going mainstream. For example, there is an increasing number of genetic diagnoses, while at the same time, the costs to sequence a human genome are reducing.

Perhaps the most significant force propelling precision medicine forward is a growing interest from patients.

Patients find genomics more appealing than ever.

In my practice, I have seen a sharp rise in the number of patients asking about genetic and genomic tests. Healthcare consumers are drawn to the idea that this information can unlock answers to persistent health problems, or reveal risk for future issues. And a proliferation of accessible, affordable testing has whet their appetite for much more.

Many people have experienced personalized genetic testing. These tests look at single nucleotide polymorphisms, or SNPs (pronounced "snips"), which are common variants in a single base pair. Results of these tests might indicate that they have the taste for bitter coffee, or have ancestors from West Africa, or are carriers for Cystic Fibrosis.


Dr. Joel Diamond

These tests are appealing to consumers because they are easy to find and relatively inexpensive. Search the web, and you'll find hundreds of companies offering personalized medicine based on DNA data to design your perfect diet or exercise program, for example. Unfortunately, this segment can be fraught with misrepresentation on the outcomes.

Certainly, large population comparisons of linked SNP data will help advance science, but many of my patients have felt that their experience with genetic testing was little more than a parlour trick.

Next Generation Sequencing (NGS) can be much more comprehensive. Whole genome testing includes all 3 billion nucleotides or base pairs. More practically, exome testing includes only the part of our DNA that codes for proteins. Despite surprisingly consisting of only about 2% of the entire genome, it accounts for over 20,000 genes and contains over 85% of disease variants known today.

How does precision medicine work at the point of care?

Let's look at the potentially genetic disorder of hyperlipidemia as an example. Hyperlipidemia is an abnormally high concentration of fats or lipids such as cholesterol and triglycerides in the blood. These conditions double the risk for heart disease.

According to Canadian Health Measures, about one in five (19%) Canadian adults has unhealthy levels of low-density lipoprotein (LDL), or "bad" cholesterol. Many adults over 40 are taking drugs to lower their LDL (high-dose statins). Unfortunately, patients who have the inherited version of the condition will not respond to this class of drugs.

Recently a new class of drugs, called PCSK9 inhibitors, have been found to be very effective to treat this condition in the familial form. They can be expensive, so it's important to prescribe for patients that will respond best to them.

Four trends to watch as precision medicine reaches the point of care

As a physician, I see great promise in genomics and precision medicine to en-

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Making the Case for Engaged Patients

Patient engagement demonstrates better health outcomes at lower cost

By Shannon Malovec, TELUS Health

As Principal of Patient Engagement Solutions at TELUS Health, Shannon is a strategic health informatics leader for patient-facing products, applications, delivery and consulting. With executive experience at the provincial and international level, she is passionate about transforming healthcare through patient engagement.

> **"Care models have always centred on the provider. But newer solutions are putting patient needs first, and it's no surprise they're bringing major benefits."**

When Alicia Raimundo was a child, sadness and anxiety were a daily mountain to climb. As she entered her teens, feeling deeply disconnected and unable to help herself, she attempted suicide.

Now an impassioned speaker, author and mental health superhero, Alicia reflects on that difficult time and the critical importance of connected self-care to treat mental illness. Every day, she helps others pull themselves out of the darkness. And by co-designing a mental health patient engagement app for the national Sandbox Youth Mental Health Initiative, she was able to channel her experience.

Putting patients at the centre

Patient engagement is a concept that has been gaining momentum across the world.

Engaged patients play an active role in good health. Many providers are now offering more ways to be involved in the journey, including tools that let us manage our health from anywhere and more easily connect with care. Patients are using these tools to share self-monitored health metrics with our care teams, view our lab results, book appointments and discuss progress. And we're staying healthier as a result.

Of course it makes intuitive sense to put patients at the centre of our own health, where we belong. But patient engagement programs across the country are also turning out hard numbers on the benefits: healthier outcomes at lower costs, and better experiences for both patients and the providers who care for us.

Opening the window on care

There are many ways patients can become more engaged in our own care, including

- **Sharing** data like mood, fitness, blood pressure and glucose
- **Viewing** lab results, immunizations, medications and other clinical summary data
- **Communicating** with providers for appointments, prescription renewals, alerts and secure messages

Better health

Taking healthcare beyond hospital and clinic walls to empower patients

Alicia Raimundo sees the massive potential of connected mental health technologies like the Sandbox initiative's patient engagement tool.

"Ongoing mood monitoring is great," she says, "but not in isolation. What would a patient do with five straight days of 'sad'? We need that data to be connected to the expertise and evidence-based care plans of our care teams."

Sandbox participants use the TELUS Health solution to record day-to-day feelings in connection with a care provider and action plan. Most reported greater self-awareness and autonomy, and improved relationships with their therapy teams.

"This technology is a lifeline," said Walter, who used the app to manage his panic attacks and get back to the activities he loves, like golf. "It will help a lot of people – and maybe even save someone's life."

Patient engagement is also poised to boost health in other ways across the country.

TELUS Health recently partnered with eHealth Saskatchewan to roll out a personal health record to over a thousand people, who gained access to their medical history, lab results, vaccination records, prescription history and more. Close to 90% of participants saw great value in being able to access and contribute to health records, and felt it would lead to better health.

Some of these patients love the tool simply as a support for wellness. But patient engagement technologies can be life-changing for people living with chronic conditions.

"With no kidney function on one side, I undergo constant testing," said eHealth Saskatchewan participant Tyler. "This tool lets me take an active role in my own health rather than wait for my doctor to call."

Lower costs

Preventing unnecessary hospital admissions for chronic disease patients

Patient engagement is also a powerful way to reduce care costs. Global research shows that patients who are less engaged cost the health system up to 21% more than those who are engaged,[1] and Canadian results confirm this finding.

Through a British Columbia home health monitoring project, patients with heart and lung disease use wireless devices at home to measure their own vitals, which they send to their medical team through regular electronic updates. If things don't look good, a team member calls to deal with the issue proactively.

The project resulted in a remarkable 76% lower use of the health system among participants, translating to a cost avoidance of between $4,000 and $14,000 per patient. Adding up the high cost of both acute care and chronic disease, potential savings can be dramatic to say the least.

But ongoing monitoring to avoid acute care is ultimately about better quality of life. Said another project participant Carolyn: "The technology makes me feel more secure because I'm being monitored 24-7 in the safety of my own home."

Great experiences

Convenience and time savings for patients and healthcare staff alike

Finally, patient engagement tools can make every interaction with care easier and faster. Clients at the Mission Oaks Medical Centre in Mission, B.C. have embraced their new portal to book visits, view records and communicate with the clinic. It's convenient for patients and saves valuable staff time on phone calls.

The clinic also uses the portal to send automatic alerts. Calling or sending notification letters used to take days. Now the portal lets staff automate alerts in minutes. And they work. A recent reminder to women due for breast cancer screening saw 78% log into the system within two days to initiate their screening.

Canadians want to be engaged:

- 89% think digital health technology will lead to **better care**
- 85% **lack access** to these tools
- 80% **would use** digital health solutions if available[2]

"The alerts went very smoothly," said Erin, the clinic's medical office assistant. "We plan to set up more notifications for other conditions and recalls."

The promise of mobile health technologies

Patient engagement apps and solutions are showing a great deal of promise. And Canadians are clearly keen to use them.

Fortunately, the health technology market is stepping up. Global forecasts for mobile health solutions are nearing US $60 billion by 2020.

Right now, patients in many locales have access to products like personal health records and remote consultation apps. As we see more of these technologies rolled out to engage patients and simplify healthcare delivery, all signs point to better health at a lower cost.

[1] O'Conner et al. "Understanding factors affecting patient and public engagement and recruitment to digital health interventions: A systematic review of qualitative studies," 2016.

[2] TELUS Health digital health survey, 2016. Conducted by MARU/VCR&C.

Patient engagement solutions show great promise to drive down health costs while improving health outcomes and patient experiences.
To reach Shannon and the Patient Engagement team at TELUS Health, email **patientengagement@telus.com**

Innovation in Canadian healthcare: Getting past the perpetual pilot phase

BY ZAKI HAKIM, RORY LATTIMER, DAVID BACH AND KARIM KESHAVJEE

According to the Conference Board of Canada, Canada lags other jurisdictions in innovation, but not due to a lack of trying. Millions of dollars have been poured into research and innovation over the last two decades. Recent Federal and Provincial reports propose theories about why innovations haven't spread, but recommendations made are little different than those of previous reports.

We conducted a thorough review of the literature to better understand the entire innovation dissemination process –from bench to bedside. We developed an integrative framework that utilizes components of well-established frameworks to assess the chances of success of implementation of innovations in the healthcare system.

Five constructs were established as being key to the success of any innovation program: the program's governance; the presence of health system coalitions; policies to support and nurture innovation; the use of implementation best practices; and the rigor of economic evaluations.

Why these five constructs?

- Governance speaks to the mission and vision of a project or program. Every innovation needs a champion.
- Coalitions of health systems are more likely to succeed in developing an innovation and managing the risks inherent in implementing new ideas and techniques. Innovations developed in isolation are unlikely to spread if they don't account for the heterogeneity of organizations and contexts across our diverse nation.
- Innovation policies are needed to develop and nurture an innovation market. Researchers are not entrepreneurs. Innovations need clear signals from health system purchasers around their needs and willingness to pay for novel solutions.
- Implementation best practices. The healthcare system is complex and translating innovations developed in one setting into another is not a trivial task.
- Finally, evaluations are extremely important to ensure that innovations deliver on their promises. Canada is world-class when it comes to effectiveness and economic evaluations. Where we do poorly is in conducting health system commercialization evaluations. For example, what are providers and patients willing to pay for new services or products?

The authors independently evaluated three innovation initiatives in Canada: a Federal innovation agenda outlined in Unleashing Innovation: Excellent Healthcare for Canada, Ontario's Office of the Chief Health Innovation Strategist and the Alberta Innovates Health Solutions program.

Our assessment found that Federal and Provincial innovation policies actually perform quite well on governance, health system coalitions and incentives for innovation.

However, they underperform in encouraging use of implementation best practices and meaningful economic evaluations from the perspectives of individual stakeholders.

Economic evaluations such as willingness to pay studies, and budgetary impact analyses, are rarely done. Without these crucial market development studies, industry players face unmanageable risks and purchasers face unpalatable costs, leading to poor transaction economics and exchanges.

Our findings clearly identify the rate-limiting step in widespread dissemination of innovations.

These findings are entirely consistent with and explain the common experience that pilot projects rule the day!

We thus encourage all levels of government that wish to transform the healthcare system to embrace additional policy elements, readily available within our framework (soon to be published), that will encourage informed risk taking among all healthcare stakeholders. Improved policy elements would also remove the bottlenecks that prevent pilot projects from gaining wider traction.

Markham hospital implements BI solution to improve efficiencies

BY NEIL ZEIDENBERG

Markham Stouffville Hospital (MSH), a two-site hospital serving Markham, Stouffville and Uxbridge, just northeast of Toronto, recently launched a business intelligence tool that integrates data from multiple hospital systems, including clinical, health records, and financial.

With so many different applications on different platforms, MSH wanted a solution that could pull data from all of the software systems. It also needed to be easy for clinicians to use, and would provide the desired insights without a lot of effort.

"We wanted to turn all the mandatory data we collect into useful information," said May Chang, EVP and Chief Admin Officer.

"Information is only useful if it can help us improve patient care, efficiencies or quality," she said. "We wanted to identify areas we could improve on in the hospital."

Importantly, the hospital wished to turn information about daily patient interactions into insights that can help frontline staff deliver improved patient care.

The project began in May 2016, and the BI solution went live in December 2016, rolling out across the hospital. MSH is using the WebFOCUS tool from Information Builders (www.informationbuilders.com), a leader in Business Intelligence and Analytics solutions.

WebFOCUS works on top of the data warehouse in Microsoft SQL, drawing data from a variety of systems, including the Meditech EHR. WebFOCUS integrates the data, and brings it into the data warehouse environment where the BI tools help generate the actual report.

"Prior to the BI tool, we estimate we spent about 80-percent of our time processing data to generate reports, and just 20 percent actually thinking about the data," said Richard Opara, Director, Planning & Business Intelligence. "The BI tool allows us to flip that ratio. With automation and integration, we now spend 20-percent of the time processing the data, and 80 percent of time looking for opportunities to introduce better, more efficient patient care."

At MSH, investment in the BI tool is critical to managing its operations to provide quality patient care on a sustainable basis. With accurate and timely insights on how they spend patient care dollars, Opara believes they can run the hospital more efficiently.

"We are targeting a five percent reduction in our cost per weighted case by using the BI tool to inform our operations over the next year," said Opara. "The BI tool will also help us track the quality of care we provide to our patients."

Among the challenges faced by MSH was trying to convince clinicians it was the way to go. Because it was so new, clinicians didn't understand the power of the tool.

"At first they didn't believe it would help them in their decision-making, but after a successful demo, many physicians got really excited about it," said Chang. Surgeons were interested in how the data could be used to improve the service they provide and to reach better outcomes. "Physicians want to be the best and this tool allows them to see where they are, and how they can use BI and analytics to be even better."

MSH designed a custom dashboard to help with case costing – a ministry requirement used to compare a hospital's performance, and shows them where they can be more efficient.

Case costing can help standardize care, and move quality of care to a new level. The ministry sets out guidelines for standards, and care costing tracks how closely those standards are being followed.

Having a data warehouse can help MSH improve patient care and administration by allowing them to compare physician to physician, department to department, and from that, develop best practices. "If one physician can work more efficiently and at a lower cost, we want to look at how that happens, and use it to improve quality. We strive to not just be better, but to be the best in the province," said Chang.

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What is the best road to follow for the pan-Canadian health record?

BY THOMAS HOUGH, CMC

Canadian Diagnostic Imaging repositories (DI-rs) – are they making the grade? I am one industry consultant who thinks not. Why? In a number of cases, vendors have not yet delivered what they said they would, resulting in less functionality than is needed to interconnect the repositories across Canada.

Additionally, some hospitals do not yet trust the DI repositories enough to use them exclusively for the long-term storage of their DI exams.

Vendor Neutral Archives have come a long way since the DI-rs were acquired and now exceed what a PACS archive does with new and different functions.

This was clearly proven by a number of VNA vendors at RSNA16 in Chicago. So, what is holding Canada back from achieving the original Canada Health Infoway mandate of inter-connecting all DI-rs so we have the Pan-Canadian Electronic Health Record?

Today's current state-of-the-art VNA offers much more capability than three to five years ago. Here are a few examples:

- Support for DICOM and Non-DICOM content – the ability to archive any and all formats of clinical records, in any format, from .docx to PDF to AVI and have the complete patient health event records indexed in one location is very valuable. It ensures the clinician can access what is relevant to the current disease for the patient.
- Data integrity is high importance. Vendors such as Karos Health have built patient-matching algorithms comparing patient demographic data from multiple different PACS archives or DI-rs to identify potential matches through an automated process. This ensures the real Mary Jones is the same Mary Jones across the region, resulting in delivery of the full Mary Jones patient record to clinicians regardless of where Mary or the clinicians may be located. By providing the big picture of Mary's health events, along with the ability for clinicians to pick and choose details on any event without having to Google or search for the detail, has reduced time to the best possible diagnosis.


Thomas Hough

- Integration between VNAs, EMRs and PACS has resulted in pre-fetching and query/retrieval of relevant prior exams, reports and other relevant clinical info to clinicians via a relevant clinical workflow for their clinical role is perhaps the most important function. Yet, this remains the least developed so far. Some VNA vendors are miles ahead on this front than others.
- Support for XDS and XDSi repositories to access patient-care events, regardless where they occurred across any of the healthcare enterprises or clinics in Canada.
- Today's DI-rs are too costly to continue to maintain running the way they are. Diagnostic Imaging storage requirements in hospitals are now accelerating, due to some CTs generating between 10,000 and 20,000 images for some cases. As a result, a better and more cost effective ROI for storage needs to be found. Healthcare regions who recognize this problem will act upon it prior to becoming an issue; others may wait until it is too late, resulting in hasty decisions of poor quality.

The state-of-the-art VNA of today appears to be better suited to achieving Infoway's original mandate of inter-connectivity across Canada. And from what I have seen, VNA vendors who are smaller tend to be more advanced in the development of functionality required for the pan-Canadian DI archive. The larger vendors have some catching-up to do in many of the areas I mentioned.

Thomas Hough is founder and president of Mississauga, Ont.-based True North Consulting & Associates Inc.

VIEWPOINT

Medical billing solution apps becoming popular with doctors in Canada

Dr. Bill has close to 1,000 physicians signed up on its platform in British Columbia and Ontario.

BY DR. SUNNY MALHOTRA

Most doctors in Canada get paid by submitting "invoices" concerning what they did with the patients they saw to their ministries of health. Under this fee-for-service model, physicians get reimbursed by each province's health insurance plan.

This system means that healthcare providers have to do a lot of paperwork just to get paid. Imagine filing your taxes multiple times each month. For most physicians, this adds hours of extra work each week to an already hectic schedule.

Like accounting, medical billing can be equally arcane. In many provinces, the "fee schedule" for services is over 500 pages long and the rules are complex. This makes it hard for doctors to ensure they get paid correctly for the services they provide.

Not only is it time-consuming, but there's a material cost to these tasks. Organizations spend over $20,000 each year per physician to deal with provincial health agencies about billing issues.

For those in hospital systems, budget cuts have led to less staff to help doctors with their billing. Even if doctors decide to outsource their billing to a third-party agency to save time, their overhead costs can increase by 5 to 10 percent. They also lose direct control over their primary source of income.

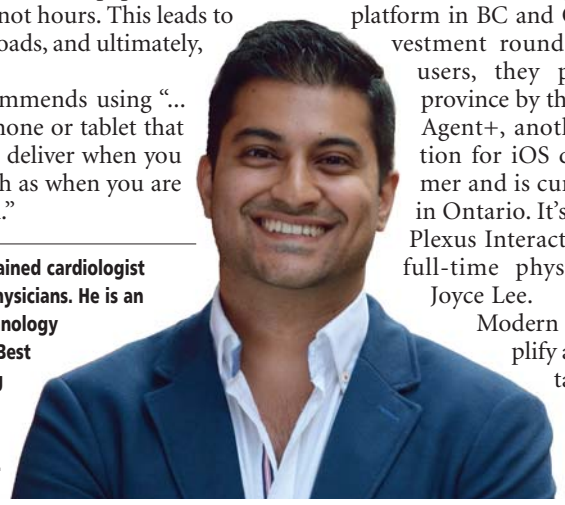
Most healthcare organizations use electronic medical record (EMR) systems that include billing functions. In Ontario, 82% of primary care providers are using EMR software from major vendors including Telus Health, QHR and Epic. The problem is, these systems are installed on desktop computers and can't be taken on the go.

Mobile doctors who move from patient to patient will keep track of everything on pieces of paper until they can get back to their computers. This can cause real headaches, and the Canadian Medical Association (CMA) estimates that the average physician fails to claim at least 5 percent of the insured services they provide. For a doctor billing $300,000 each year, that means losing at least $15,000 of income.

In short, billing is a pain for healthcare professionals – but there is a better way. New mobile apps are helping doctors cut down on paperwork and do their billing in minutes, not hours. This leads to more manageable workloads, and ultimately, better patient outcomes.

> **The CMA estimates that the average physician fails to claim at least 5 percent of the insured services they provide each year.**

The CMA itself recommends using "... an app for your smartphone or tablet that captures all services you deliver when you are out of the office, such as when you are on call or at the hospital."



Dr. Sunny Malhotra is a US trained cardiologist working at AdvantageCare Physicians. He is an entrepreneur and health technology investor. He is the winner of Best in Healthcare - Notable Young Professional 2014 and the national Governor General's Caring Canadian Award 2015. Twitter: @drsunnymalhotra

Dr. Bill (www.dr-bill.ca), an app available for iPhones and Android devices and on the web, does just that. It lets doctors snap pictures of patient data and log claims in seconds. Their service also includes support from live billing agents who help doctors with their billing.

This mobile-first billing solution comes from a Vancouver-based startup that understands the problem that doctors face. "We don't think doctors should have to spend hours on administrative tasks. They're already so busy, and should instead be focused on helping patients and saving lives," says Steve Lionais, CEO and co-founder of Dr. Bill.

Physicians can save almost 10 hours of work each month on average. By doing billing while they work instead of in batches, it also helps doctors reduce the chance of losing any claims.

Dr. Bill is now launching in the Ontario market and has close to 1,000 physicians signed up on its platform in BC and Ontario. After raising an investment round from some of their own users, they plan to expand to every province by the end of 2017.

Agent+, another app-based billing solution for iOS devices, launched last summer and is currently available for doctors in Ontario. It's the work of Toronto-based Plexus Interactive, a company founded by full-time physicians Jeremy Theal and Joyce Lee.

Modern solutions like these can simplify and automate administrative tasks for doctors. This helps lower healthcare costs and creates more time for patient care.

C-HOBIC dataset in CIHI's acute care discharge abstract database

BY PEGGY WHITE, RN, MN, AND KATHRYN HANNAH, RN, PHD

Over the past 2 decades, government and provider organizations throughout the Canadian healthcare system have invested heavily in the acquisition and deployment of health information systems, including electronic health records (EHRs).

By virtue of nurses being the largest constituency of health professionals in Canada, they are also the predominant users and contributors of clinical data. Capturing healthcare data, including nursing data, in a structured way is essential to accomplish the vision of accurate, reliable, clinically meaningful measurement across systems and settings of care.

National and jurisdictional endorsements of data and documentation standards such as interRAI, SNOMED-CT, LOINC and ICNP have set the stage for the adoption of data standards in Canada.

In progress since 2006, the Canadian Health Outcomes for Better Information and Care (C-HOBIC) focuses on the electronic collection of standardized, evidence-based, clinical patient outcomes in acute care, long-term care and home care sectors of the healthcare system.

The introduction of a systematic, structured language to documentation of patient assessments enables the information to be consistently captured within organizational and jurisdictional EHRs and made available to clinicians across the continuum of care. The C-HOBIC dataset consists of the following categories:

- Functional status and continence
- Symptoms – pain, nausea, fatigue, dyspnea
- Safety outcomes – falls, pressure ulcers
- Therapeutic self-care (readiness for discharge).

The C-HOBIC concepts represent dimensions of patients' health status that all clinicians assess every day. The difference from traditional practice is that information is gathered electronically in a standardized way. Where possible the C-HOBIC concepts are assessed using interRAI measures to support standardizing the collection of clinical data and reducing burden to clinicians. The C-HOBIC Data Set has been mapped to ICNP and SNOMED CT to support inclusion in EHRs.

> **C-HOBIC enables structured information to be captured and shared among clinicians.**

This initiative was sponsored by the Canadian Nurses Association with funding from Canada Health Infoway and participating provincial partners.

Initially the focus was on implementation of the dataset in three provinces within Canada, with standardized questions on these concepts included in admission and discharge assessments. The plan was to then work with clinicians regarding the value of this data in evaluating clinical practice.

In the next phase, the focus was on facilitating patient transitions through the provision of a synoptic report to support sharing of clinical information between clinical disciplines and care settings.

Findings from the evaluation support the value of the C-HOBIC information in supporting care transitions; however it was clear that more effort needs to be directed towards integrating the

CONTINUED ON PAGE 22

New solutions enable clinicians to share data more easily with patients

Traditionally, patients have found it difficult to obtain their own data. It's better for all to provide easier access.

BY DIANNE DANIEL

Modern and fast. Those were the features that mattered most to Nathan Hiebert, president of Winnipeg-based Code-Med Inc., when he was looking for an electronic medical record (EMR) to support his company's 300 physician clients across Manitoba. He also hoped for a platform that would see patients become active participants in their own health records.

When he discovered InputHealth through the University of British Columbia, he not only had his answer but finally had a way to move forward with a ground-breaking plan to launch a private house call and virtual clinic as well. "I was very impressed at the time and I still am because they are modern in healthcare and they are putting patients first," said Hiebert.

InputHealth, founded in 2011 by the company's CEO Dr. Damon Ramsey and CTO Shawn Jung, is on a mission to engage patients through the Internet of Things (IoT) – a network of physical objects embedded with electronics, software, sensors and network connectivity so that they can easily collect and exchange data.

Rather than trying to evolve antiquated EMR systems, the company is taking an aggressive stance to head in a brand new direction, leading a paradigm shift from the EMR to the collaborative health record supported by an entirely digital ecosystem – one that makes use of the word 'electronic' redundant when referring to medical records.

"It's our philosophy that in the 21st century when we talk about the health record, it's really not just for documentation, it's also for collaboration and engagement," said Ramsey. "Our approach is to bring the patient in and make them an equal partner in their own health record, facilitating different types of workflows where patients can actually drive their own health."

The company's cloud-based service is built on the Microsoft Azure cloud computing platform and incorporates open source software such as Linux and Ruby on Rails, a server-side web application framework.

Early on, it benefitted from Microsoft's BizSpark program which provides free software, service, tech support and Azure cloud services to qualified start-ups. Google Chrome is the only requirement to run its service on the provider side and patients can access it from any device or desktop web browser.

InputHealth currently offers six modules: online booking, documentation, virtual care through secure video and messaging, dynamic patient questionnaires, kiosk features and the ability to track outcomes through structured data capture.

The pivotal piece is Qnaire, digital forms that patients complete prior to their initial clinic visit. The forms are designed to transform patient-provided information into actionable data, using branching logic and algorithms to "help triage and take people in the right direction," said Ramsey.

For example, a patient seeking treatment for depression will automatically be directed into the depression pathway, which includes a set of outcome tracking tools as well as history-taking tools. One question might be: Are you having trouble with sleep? Yes or No. The subsequent questions would be: How long would you estimate you sleep per night? and What is the quality of that sleep?

Each answer represents a digital data point that is automatically stored in a structured format, making it easier to perform outcome analysis later on.

"It has always been our belief that if we can centralize things in the collaborative health record and stop building these add-ons, then what we'll have is a much more actionable set of data, something that is consistent and representative of patient interactions in real healthcare," explained Ramsey.

"When they come in for their depression follow-up in two weeks, and they say they're now sleeping an average of six hours a night, we can now qualify our intervention with that patient-generated data, which we're finding is much more accurate, much more representative and much more actionable from a longitudinal perspective."

ILLUSTRATION: LINDA WEISS

Right now InputHealth is focused is on capturing market share by selling its cloud-based service to clinical care delivery organizations, from small clinics to chain clinics to larger health facilities. The fundamental premise is that patients should be contributing to their records and that they should never be charged a fee to access the information.

In Manitoba, Hiebert expects to start moving Code-Med physician clients over to InputHealth by mid-summer. In the meantime, he is using the service as a platform to run Timely Care Clinic Inc., a private house call and virtual care clinic he recently launched as an alternative care path for Manitobans, who face some of the longest wait times in the country.

The clinic is run by a team of nurse practitioners and fees range from $40 per virtual visit or $50 per home visit to $80 for a home physical or $20 for a sick note.

As soon as they start to book an appointment on the Timely Care Clinic website, patients are actively involved in creating their own health record. Each of the roughly 170 issues treated by the clinic's nurse practitioners is linked to an evidence-based Qnaire to generate actionable data. At the end of a visit, all information, including lab reports, is shared with the patient through the InputHealth app.

"InputHealth is not just a patient portal. It's a patient engagement piece from start to finish," said Hiebert. "If you want to see your full chart, you just log in through the patient portal and we'll share all documents with you."

According to research from the OpenNotes Patient Safety Initiative in the U.S., engaged patients have better outcomes, particularly when doctors share their notes. One study reported that 77 to 87 percent of patients said accessing notes made them feel more in control of their healthcare. A 2012 study found that as many as 78 percent of patients said access to notes helped them take their medications as prescribed.

Input Health's Ramsey refers to patient engagement as an evolving science. In the absence of evidence-based guidelines, he advises clients to choose how much information they share with their patients.

InputHealth's software is sophisticated enough to track whether or not patients actually log in to see a lab report or a psychiatry note, for example, and will log how many times they access their record as well as how long they spend reading it.

"If I send them a psychiatry note and I see the patient logged in 60 times over the past month and spent 45 minutes each session, they're probably quite nervous and making assumptions," said Dr. Ramsey.

MedChart Inc. of Toronto is another company working to keep patients in the loop when it comes to their personal health information. Its cloud-based portal enables patients to request health records from any single health records department in Canada. The fee per request is $9.99, and any additional access fees that may be charged are passed on to the patient.

As MedChart CEO James Bateman said, step one was to "do this impossible thing of giving patients access to their health records system-wide, from every healthcare provider in the country." Step two is to continue to lower the barriers to access, so that patients receive timely access to their own medical information and are able to interpret and digest the data they receive.

MedChart's intent is to retrieve, digitize and securely store health information, giving patients control over what information is shared when and with who. A key difference between MedChart and other patient portals is that medical files are presented in their entirety with no editing or "curation" applied.

Documents are typically provided to MedChart in PDF form. The company runs an internal algorithm to make the information searchable and also applies document classification principles to divide the information into smaller, more manageable chunks.

Patients log in to view their records using a secure user name and password, and two-factor authentication can also be added, requesting a code to be sent to their mobile phone or email, for example.

"Our approach is that the patient has a right to their medical data as per the Supreme Court of Canada, so everything is on the file, it's all yours," said Bateman.

CAREpath, a division of Bayshore Healthcare Ltd., is currently offering MedChart as part of its national cancer assistance program. The automated record acquisition service replaces a time-consuming manual process that involved making requests for information via fax, waiting for records to come in, painstakingly sorting them, scanning them and uploading them to patient charts.

"It consumed a lot of my time – pretty much my whole day," said CAREpath clinical coordinator Sandra Saraydarian. "Now with MedChart, we can get the note the same day, upload it and it's ready for the nurse to review. It's a lot more seamless and easier for us to use."

MedChart is based on a consent framework. As soon as a CAREpath patient provides electronic consent, the nurse assigned to the file is able to access and request their medical records, and will review the information with them before releasing it. The benefit is that cancer patients have easy access to their medical records in one place and can easily share that information with any treating physician, even if they happen to be visiting another country.

Based on the success of its initial rollout, CAREpath director Sherry Hnatyshyn, RN, expects MedChart will spread to other assistance programs within CAREpath. When she says the online patient portal provides a more secure process for accessing personal health information and is easy to navigate, she speaks from personal experience. Hnatyshyn had the opportunity to use MedChart while advocating for her own children and says she was extremely satisfied.

"It really did empower me as a parent to ask the right questions and to move a health concern forward for my children," said Hnatyshyn. "My family doctor didn't have the reports and I was able to bring them to him."

Toronto's Hospital for Sick Children (SickKids) is working to improve access to health information with the launch of a multi-year project to implement the Epic fully integrated health information system by June 2018, including an online portal called MyChart.

The hospital has assembled more than 100 project staff, including project managers, application specialists, application coordinators, technical specialists and integration specialists, and engaged 13 physician champions. It is partnering with Children's Hospital of Eastern Ontario (CHEO) in Ottawa to develop and implement the first integrated Canadian paediatric instance of Epic, and will leverage CHEO's prior experience using MyChart.

"We want to roll it out in a very limited way, so that we can manage expectations and make sure the experience is good," said Dr. Karim Jessa, chief medical information officer at SickKids, noting that health records in the MyChart patient portal will initially be available for view only. The hospital will be developing policies around the release of sensitive information to ensure potentially bad news is conveyed in person before a patient is able to see it on the portal, he added.

In addition to providing families with anytime access to their health information, the project will fundamentally change the way SickKids provides care by bringing all patient information and charting into one integrated electronic system.

"Right now, everything is on paper, it's fragmented. If you have an appointment in three months and they give you pre-checkup instructions for a procedure or a lab requisition ... what happens if you lose it?" said Dr. Jessa, noting that trying to recover lost information can be frustrating and may even lead to a missed appointment. "If we can engage with patients to say this is where all of your instructions are, this is where it's located, then we can hopefully improve that experience."

Once the implementation is live, future possibilities include using the patient portal to transmit images or to conduct video consults, enabling patient-reported outcomes to be collected via online questionnaires, and potentially incorporating links to wearable devices or intelligent monitors.

Embracing analytics: The role of the citizen data analyst and consumer

BY SUSAN ANDERSON

The winds of change are blowing in the analytics field. Traditionally, analytics teams were made up of professionals with complementary skills that typically include a data scientist, solution architect, data hygienist, data explorers, data expert and initiative expert.

Because of the range of skills needed, it was rare for an organization to find one individual who could perform well across this professional spectrum. In other words, a team effort was generally required. And still today, many of the medium to large healthcare organizations recruit analytics teams.

These teams are tasked with gathering data sets, data warehouses and business intelligence data cubes as well as developing dashboards.

But the industry is changing. Consistent with the trend of emphasizing public participation in consumer health, we are witnessing the emergence of the 'citizen data analyst'. Gartner coined the term 'citizen data scientist' in recognition that everyone is in a position today to take on this new role in their work and their outside life.

Analytics technologies have now advanced to the point that anyone within an organization can leverage user-friendly tools to execute analytics tasks and arrive at meaningful information in addressing questions – all without needing to call on the professional analytics team.


Susan Anderson

With broader access to their digital health data, we can expect that many Canadian consumers will join the community of citizen data analysts. Tethered portals for patients have provided a useful learning environment whereby some Canadian provider organizations have enabled patient-viewing of portions of their health data.

This can be seen in the recent unveiling of Alberta's Health Quality Council's (HQCA) Emergency Department Length of Stay analytics platform. The intended audience of this new public website includes the public, providers and health system administrators.

Its goal is "to encourage thinking about why differences (between Emergency Departments) might exist [and how they] can start conversations and lead to solutions for improved quality of healthcare." Instead of providing limited interpretations of all the data collected, everyone is invited to join the conversation.

It's not solely websites that are embracing the citizen data analyst. The next wave of tools will shift from provider-managed data to consumer-managed data, and will ultimately result in consumer patients having direct management of their electronic health record, with data flowing from provider systems via application program interfaces.

Despite a wonderful blitz of technology enablement for analytics over the past few years, many healthcare leaders continue to find themselves trying to answer questions without having a firm grasp on the underlying data required to support decisions. This is true at both the public policy development level and at the health delivery, patient-encounter, decision-support level.

Luckily this issue is being gradually addressed by websites like Patients Like Me (PLM), which provides an analytics platform that is fueled by publicly contributed personal health information. Today, PLM has over 500,000 contributors with a range of over 2,700 conditions and one simple mission: to put patients first.

Jamie Haywood, co-founder of PLM, stated that "We started with the assumption that patients had knowledge we needed, rather than we had knowledge they needed. We didn't have the answers, but patients had the insights that could help us collectively find them." PLM is a

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Workflow software

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quickly pull down relevant information from worklists, perform the study and send it to the Influx reporting system, which is integrated with the cardiology PACS system, for immediate physician reporting. The process removes many time consuming steps in the process, automates old paper-based systems and reduces the potential for errors.

All that has made Sharma, a veteran of more than 20 years in hospital information work, ever so aware of just how much can go wrong in paper-based cardiology or pulmonary testing.

"Typically, a patient comes in for a breathing or another pulmonary function test. The respiratory therapist doing the test might make some written notes and place them in the in-tray for the respirologist to take a look at and interpret the results, who then also makes notes and then signs off on the report. That all gets printed up and put in another bin for sending off to the referring physician or wherever it needs to go. With so many hands touching the report, the potential for error or loss is substantial," observes Sharma.

As a solution to this challenge, Influx Workflow offers what Sharma calls an automated, multi-diagnostic solution.

"If a customer of ours has different respiratory testing devices from different vendors, the 'secret sauce' we have in our workflow software can take the data from all of them and streamline it into a standardized format, which we then send along with their related images to the cardiology PACS system," explains Sharma. "Even though it is respiratory data, the cardiology PACS system can analyze the information through what we call 'finding codes', based on how doctors interpret reports, and make reports readily understandable to respirologists."

This is not to say that making Respiratory Workflow understandable and easy-to-use for St. Mike's clinicians happened overnight.

"It did take us longer than expected," admits respiratory therapist Leek. "But what got us through it was that we have involved everybody at the hospital who is involved with the system – therapists, physicians, our IT people and nurse practitioners, among others. And we kept working together over the past year to get us where we are today."

And where they are today, is that respiratory workflow at St. Michael's has gone virtually paperless. Preliminary respiratory reports are available to all in patients' electronic charts almost immediately after being written. Final reports are not far behind, often showing up same day.

Measuring the improved efficiency Respiratory Workflow brings in terms of cost-savings, and other new efficiencies, may be easy to envision but difficult to actually measure. However, folks at Influx are working on that too. Their Cardiology Workflow already provides an "Efficiency Calculator" on the company website. Based on the number of diagnostic tests you perform annually, you can plug in your study volumes and get an estimate of the savings you're likely to make and calculate your return on investment. A similar tool is in the works for Respiratory Workflow. For more information, see: http://influxworkflow.com

Embracing analytics: The role of the citizen data analyst

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remarkable example of engaging consumers by putting data in the hands of citizen data analysts who want to make a difference in the world.

It's not solely independent organizations that see the benefit of this shift. The U.S. Centers for Medicare and Medicaid (CMS) and the Office of the National Coordinator for Health IT (ONC) regulatory requirements have shifted towards greater adoption of analytics.

Specifically, ONC's Stage 3 meaningful use program has identified January, 2018 as the date requirement for health providers to give consumers direct connectivity to their healthcare data using application program interfaces. While no such deadlines have been set in Canada, we can expect this country's emphasis on digital health will come to echo U.S. efforts.

So how does one become a citizen data analyst? How can consumers and healthcare leaders become more involved in understanding their own health information? Analytics can be as straightforward as a three-step process for realizing real benefits without waiting years for results:

1. Instead of focusing on building a data mountain, start by framing the question or problem that is most pressing to you;
2. Explore, discover and learn with the data that is available within your reach. Work with tools such as a simple spreadsheet, a web site with visual dashboarding, or an embedded machine learning model that has been prepared by others;
3. Capture and record useful knowledge from step two that yields information on the question, outcome or business problem from step one. AND, with your new knowledge from step two, identify some gaps in your data set, and use your acquired knowledge to collect, expand data and rewind to step one. Repeat this three-step process.

With the growth of new analytics tools being made available to the consumer and healthcare leaders alike, everyone will have an opportunity to don the citizen data analyst hat. The emergence of this role will not only benefit the industry as a whole, but it'll further empower patients to have a greater understanding of their health. Truly these winds of change bring good fortune to the world of analytics.

Susan Anderson is Managing Director, Orion Health Canada.

Precision medicine: Systems must learn to provide solutions

CONTINUED FROM PAGE 8

able smarter, more precise care. Consumer interest is growing, which brings new challenges and opportunities for physicians. Trends include:

- Belief in the magic bullet. I'm seeing more and more patients who believe precision medicine will be the cure and key for every health issue, especially when diagnosis or treatment is difficult.

There is ample reason to hope, but it is up to the physician to educate consumers and set realistic expectations. There are multiple factors that have a bigger impact on health than genetics. Patients are concerned about familial inheritance for diseases, when environment and lifestyle often have a greater influence.

- Prescriptive patients. We're going to see more consumers demand specific courses of treatment based on the genetic or genomic information they have. For example, someone who finds out he or she is at risk for cardiovascular disease may request a stress test. Physicians will need new kinds of educational support to assess and stratify risk.
- Physician learning curve. Physicians are enthusiastic about the potential of personalized care plans to improve patient outcomes. But several questions remain for physicians who must put precision medicine into practice. For example, they must know which patients to test, and which tests to order for maximum predictive value. Physicians must also be able to interpret results and combine them with the patient record.
- Data outpacing science. Genomic knowledge is growing at an exponential rate, at times generating more questions than answers for researchers and physicians. We recognize many variants in DNA codes, but don't yet know what they all mean.

The area between genes, the way the gene folds itself, the protection capabilities of genes – these are areas that are not fully understood. The science is still young, and as more patients pool their data, we will be able to determine greater numbers of genetic and genomic associations.

I believe that consumers are going to drive the growth of genomics and precision medicine, faster and more efficiently than organized medicine ever could. The explosion of data, combined with hope and promise, will only continue to accelerate.

Allscripts has a strong Canadian presence from coast to coast and the development of innovative precision tools is the most recent evolution in our 35 years of commitment to improving healthcare outcomes in Canada.

Learn more on the Allscripts approach at the e-Health Conference, Toronto, June 4-7. Dr. Diamond will be presenting at the Evolving Approaches to Patient Care session on 'The Last Clinical Mile of Precision Medicine – Challenges at Point of Care' (June 7, Room 201CD from 10:30am). Dr. Joel Diamond, 2bPrecise's Chief Medical Officer, has extensive clinical and technology experience. He formerly served as CMIO and Chairman of the Physician Advisory Board at the University of Pittsburgh Medical Center, St. Margaret Memorial Hospital, where he helped achieve 100 percent adoption of CPOE in a community hospital. This is one of the first such successes in the United States. He helped develop dbMotion, a solution for health information exchange and population health, and later became the Chief Medical Officer for Population Health at Allscripts Healthcare. Dr. Diamond currently serves as Adjunct Associate Professor of Biomedical Informatics at the University of Pittsburgh. He is a diplomat of the American Board of Family Practice and a fellow in the American Academy of Family Physicians and continues to care for patients at Handelsman Family Practice in Pittsburgh, PA.

C-HOBIC data

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collection of standardized data in clinical workflow.

Also needed is the strengthening of the processes of information exchange between care providers across the continuum; and working with clinicians to effectively use standardized data such as C-HOBIC to inform their practice.

The current phase of C-HOBIC is focused on the inclusion of the C-HOBIC data set in the acute care Discharge Abstract Database (DAD) at the Canadian Institute for Health Information (CIHI).

Efforts are underway with Grey Bruce Health Services in Ontario and St. Boniface Hospital in Manitoba and two clinical information system vendors (Cerner, Allscripts) and two abstracting vendors (Med2020, 3M) to include the C-HOBIC dataset in the DAD submission.

The inclusion of the C-HOBIC Dataset in the DAD will provide standardized patient-centred clinical outcomes data from acute care to support aggregation and analysis of clinical outcomes, health system use and performance reporting. This will be the first time that data derived from nursing practice is included in the DAD, specifically clinical outcomes.

The collection of evidence-based, standardized, clinical patient outcomes offers clinicians the opportunity to improve health outcomes for the people they provide care for. With the increased focus on primary healthcare and the management of chronic disease there is a need to collect standardized information across the healthcare system.

The C-HOBIC dataset provides high-quality data that is useful, can be integrated across the care continuum and relevant to decision-making within the healthcare environment. For more information about this initiative visit: https://www.cna-aiic.ca/en/on-the-issues/best-nursing/nursing-informatics

Efforts are under way with Grey Bruce Health Services, St. Boniface Hospital, and with four vendors.

Peggy White, RN, MN, is C-HOBIC Project Director and President, Canadian Nursing Informatics Association. Kathryn Hannah, RN, PhD, is C-HOBIC National Executive Lead and Health Informatics Nursing Advisor, Canadian Nurses Association.

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