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As part of its implementation of lean methodologies for lab work, a hospital group in southern Ontario is using business intelligence that

has been optimized for laboratories. The system is helping improve speed and quality of results.
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PHOTO: UNIVERSITY HEALTH NETWORK

Research OR will develop image-guided solutions

Dr. Kazuhiro Yasufuku (l) and Dr. Jonathan Irish are leading the University Health Network's plan for an operating room that's optimized for devising and testing new image-guided surgical procedures. The Toronto-based TRIGOR project will develop image-guided, minimally invasive and molecular systems that will usher in a new generation of cancer fighting procedures. **SEE STORY ON PAGE 18.**

Surgeons control OR images using hand motions

BY JERRY ZEIDENBERG

TORONTO – Surgeons have been using diagnostic images in the operating room for years, but manipulating the pictures on monitors in the ultra-sterile environment of the OR has always been a difficult business.

Now, however, a Toronto company called Gestsure Technologies has produced a solution that enables surgeons and interventional radiologists to manage PACS images much more easily. It's done by borrowing ideas from consumer products like the Wii and Kinect, and adapting them for the OR.

In a nutshell, infrared waves are used to capture the hand motions of surgeons, allowing them to quickly change the diagnostic pictures on screen, and to do things like zoom in and out. "After they're scrubbed, surgeons and IRs can't touch computer equipment in the operating suite," commented Dr. Matt Strickland, a partner in Gestsure and a surgical resident at the University of Toronto medical school.

He explained that other solutions for controlling on-screen images without the use of touch, like voice-controlled systems, are awkward to use – the systems don't re-

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Surgeons control images in the operating room using hand motions

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spond with the speed and exactness that surgeons are looking for. Sometimes, assistants are used to change the images, but many surgeons find that it's just as frustrating to bark out requests to alter the images to nurses and techs.

And the practice of wrapping keyboards and monitors in plastic to keep them sterile is clumsy at best – it's very difficult to work the keys or use touchscreens through a layer of plastic.

Strickland says that in many cases, diagnostic images have been so difficult to use in the operating room that many surgeons simply don't bother.

By contrast, the hand-motion-controlled solution from Gestsure has been tested during the last year at Sunnybrook Health Sciences Centre, in Toronto, and has been found to work. It gives surgeons "fine control" of the medical pictures they need to see, allowing them to fly through the image stacks.

Because the system is easy to learn and use, surgeons who have deployed it are viewing diagnostic images during operations more frequently than before. "We believe that will improve the quality of outcomes and patient safety," said Strickland.

Indeed, for its part, Sunnybrook is now rolling out to more surgical suites – at the time of writing, they were about to start using the solution in neurosurgery ORs. Gestsure has been working closely at Sunnybrook with Dr. Calvin Law, a surgical oncologist.

Gestsure demonstrated its solution at the November meeting of the Radiological Society of North America, a medical conference that attracts 60,000 attendees from around the world. According to Dr. Strickland, there's currently nothing else on the market like their system.

"There's nothing that is so far along, or even close to commercialization," he said, adding that most of the solutions currently under development are academic projects. He commented that a team from Harvard University was demonstrating a rival system at the RSNA conference, but it was simplistic compared with the Canadian technology.

Dr. Calvin Law, at Sunnybrook, employs Gestsure during a procedure.

"We made the guys at Harvard cry when we told them about what we were doing," quipped Strickland. "But we spent some time with them, and gave them a lot of pointers."

His partners in Gestsure are Jamie Tremaine, an engineer specializing in machine vision, and Greg Brigley, a computer scientist. Their system makes use of an infrared camera that measures space, distances and gestures.

Virtually any off-the-shelf infra-red camera can be used, such as the Microsoft Kinect or the Asus Xtion Pro, as the intelligence of the solution is in the software. The team says it will work with virtually any PACS.

At the RSNA, Gestsure showed how the system works with Client Outlook, an innovative company based in Waterloo, Ont., whose eUnity system ties into multiple PACS and displays images on a variety of platforms. The Gestsure team was part of the Client Outlook booth on the show floor.

Gestsure has worked out a specialized system for the operating room, with enough gestures to enable surgeons to use the diagnostic images onscreen in a meaningful way, but which is also easy to learn.

"We've concentrated on a small set of gestures for most of what's needed," said Dr. Strickland. "There's a core set of five to six gestures that enable you to do most of the work." The gestures also needed to be natural. "You don't want to start doing jumping jacks in the operating room," he quipped.

The team plans to launch the system commercially early this year. For more information, visit www.gestsure.com

On a related front, there has been exploding usage of the Kinect in the medical and healthcare fields. Doctors are using Kinect to help stroke patients regain movement. Surgeons are using it to access information without leaving the operating room and in the process sacrificing sterility. Healthcare workers are even using it to help with physical therapy and children with developmental disabilities or Attention Deficit Hyperactivity Disorder (ADHD).

"Everywhere I go in the world – every hospital, college or public health organization, people are already doing something with Kinect or they plan to," said Dr. Bill Crounse, Microsoft's senior director of worldwide health, referring to medical uses of Kinect. Launched at the end of 2010 as a controller-free gaming device for Xbox, Microsoft sold a world-record 8 million Kinect devices in its first 60 days on the market. This made Kinect the fastest-selling consumer electronics device in history, according to Guinness World Records.

Correction

A photo caption in the February 2012 edition of Canadian Healthcare Technology mistakenly identified Sherri Hudson, of the Upper Canada Family Health Team, as Rene Melchers, Brockville General Hospital's IM-IT manager. We apologize for the error.

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PHILIPS

sense and simplicity

Smart Condo uses 'avatars' to assess rehab patients for return home

BY LESLIE GOODSON

A first-of-its-kind approach to assessing seniors' abilities to perform their daily activities independently at home began in 2011 at Edmonton's Glenrose Rehabilitation Hospital.

A self-contained independent living suite within Glenrose uses IBM software to monitor day-to-day activities of post-rehab elderly patients to test if they are ready to go home.

This pilot project, which represents the first real-world trial of the concept, is part of the Smart Condo initiative, a multi-year research collaboration with the University of Alberta, the IBM Alberta Centre for Advanced Studies, Natural Sciences and Engineering Research Council of Canada (NSERC), Olsonet Corporate Communications, a wireless networking company, Alberta Innovates Technology Futures (AITF) and the Alberta government.

The project involves sensors and smart devices installed throughout the suite to monitor and record the occupant's activities, such as cooking, taking medications, and number of bathroom trips at night.

Sensors have been placed in numerous spots, including doors, mattresses, cupboards and even coffee pots and cups. No cameras are used, but the project has devised a unique method of visually assessing the abilities of the participants.

"People don't want to be monitored with cameras," said David Dyer, Glenrose's director of nursing. "The data obtained of the occupant performing activities is run through software and turned into avatars (cartoon images), so there are no images of the patients themselves."

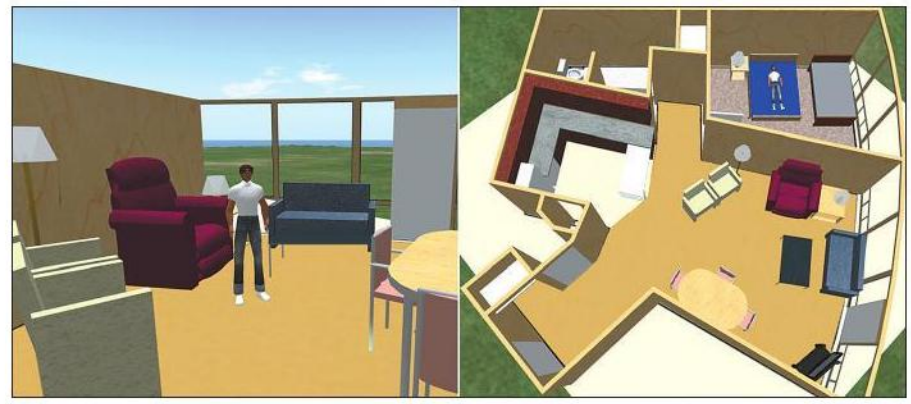
To date, six volunteers have participated, typically staying two to three days. They were being treated for illnesses that included stroke, Alzheimer's and bone fractures.

"The researchers can watch a visual representation, which is easier and quicker than reading volumes of descriptive text," said Dyer, "and monitoring is done in a way that protects people's privacy. "In this controlled environment, if something dangerous happens, we know about it and can intervene immediately.

What's more, the patient is equipped with a call button and the suite is within 100 metres of the nursing station."

The ability to transform the patients into avatars and monitor them visually is a ground-breaking innovation.

"When you view data as diverse as heart rate monitor and electrical consumption independently, out of context, it means very little. IBM's software enabled us to put the data together visually and actually see a patient's ability to function independently, so clinicians can intervene when necessary and students can learn how best to care for them," said Eleni Stroulia, NSERC/AITF industrial research chair on service systems management at the University of Alberta.



To safeguard the privacy of patients, the solution makes use of 'avatars' rather than video monitoring.

During the project, researchers identified the need to track two new activities: the use of wheelchairs and walkers, and food intake. Additionally, by monitoring subjects' use of a medication reminder device, they have determined how to improve its usability.

As well, there is tremendous potential for new monitoring technologies in the future. Dr. Gary Faulkner, Glenrose Rehabilitation Hospital's director of research, said "we're investigating wearable wireless devices that will monitor vital signs including blood pressure, breathing, and oxygenation of blood, and also working at determining balance problems and reporting patterns of unbalance before a fall occurs."

The project will test a larger number of people in more trials to determine the right mix of monitoring sensors needed to create an accurate picture of the person being observed. "We're adding more and more features," said Dr. Faulkner, "and expect to offer a suite of sensor packages, from basic to the most comprehensive."

Results so far? Dyer said the project has developed better technology for monitoring and assessing seniors' abilities to live independently at home. This is helping clinicians provide better care for patients.

"With the information gained through technology," Dr. Faulkner adds, "therapists have more confidence that people will maintain their level of independence upon returning home. We've also learned what doesn't work, what shows promise, and what doesn't."

The Glenrose Rehabilitation Foundation's financial investment over the past 18 months is close to $250,000, and the trial period is far from over, as no deadline for its conclusion has been established.

Glenrose is currently renovating the Smart Condo suite through donations from the Glenrose Foundation, with up-to-date appliances and furniture and better wireless systems that reflect modern homes to offer a greater capacity for more research.

What's more, a new Smart Condo installation is being completed at the Health Sciences Education and Research Commons, part of the University of Alberta's new Edmonton Clinic Health Academy.

Integrated voice response can improve home care efficiency

BY SCOTT R. HERRMANN

Hospitals, doctors, home care and hospice agencies have been struggling with ways to contain costs of delivering home healthcare without compromising the care delivered to the patient. I will explore two quick and easy to use applications and provide examples of how to apply the technology within a home care agency to reduce the costs of delivering care.

By using these simple automation technologies, agencies can provide a better analysis of current cost data, increase administrative and field staff productivity, reduce errors in care via unnecessary treatments, as well as eliminate potential timesheet fraud. This article (part one of two) will cover Integrated Voice Response technology and how it works for home care. In May, the second installment will cover using mobile phones with GPS technology at the point of care.

Telephony or Integrated Voice Response (IVR): Home care agencies are required to keep records of their services for accountability and for audit purposes to prove that the home care services were delivered. Currently, most companies use manual/paper-based processes to obtain and file these records, but what if we changed this process? Most agencies provide a paper care plan left in the home so the caregiver knows what to do, and perhaps a paper signature page for proof of the visit. Basically the client (patient) signs the care plan and the caregiver returns it to the office as a record of service. There are several potential areas to reduce costs in this situation. Consider the following:

All paper from the field has to be returned to the office and entered into one or more databases for payroll and billing purposes.

Many agencies are paying for the travel time and mileage back to the office to return these documents.

The arrival and departure times of the caregiver are self-reported, with little to no accountability. In most cases caregivers appear to arrive when they are told to and leave on time. Rain, traffic and snowstorms never seem to be a problem even at 8:00 AM on a Monday morning. Where is the accountability? The paper signature seems to work but if the reported visit times are rounded up by five or ten minutes that can be the equivalent of an extra visit that the staff member could do that day for the agency. This in turn would be increasing revenue for the agency without increasing the number of field staff.

Scott R. Herman

IVR systems respond to each of these concerns by offering a very simple way to get better accountability for time and attendance and eliminate the travel costs for coming back to the office. IVR is a technology that has been around since the early 90s and can be used to record the visit times and provide proof of visits in the home. It eliminates the need for paper to be carried (a non-secure method) to and from the office each day or week and can reduce the need to store paperwork on

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GE Healthcare

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Surveillance system helps track superbugs in Ontario LTC facilities

BY DIANNE CRAIG

A unique pilot project designed to assess the prevalence of antibiotic-resistant organisms (AROs) in Ontario's long-term care homes will give Public Health Ontario valuable new insight into infection rates by region and several other measures. The unusually high response rate for this voluntary study of close to 85 percent has been attributed in part to a new surveillance system designed to protect the anonymity of participating homes.

"It allows anonymous reporting of health information, with strong security and privacy guarantees for the reporters," says Dr. Khaled El Emam, an associate professor in the Faculty of Medicine at the University of Ottawa, where he holds the Canada Research Chair in Electronic Health Information. Dr. El Emam is also CEO of Ottawa-based Privacy Analytics, which developed the surveillance system used in the study.

AROs have a huge impact on patients, resources, budgets and care. According to Public Health Canada, knowing the incidence of healthcare-associated infections in long-term care facilities is particularly important, due to the increased morbidity, cost and negative impact on the quality of life for the elderly population.

While hospitals routinely monitor and report the prevalence of antibiotic-resistant organisms, long-term care facilities do not. Antibiotic-resistant bacteria have become increasingly common in nursing homes over the past two decades. This pilot project, the first ever Long Term Care ARO Prevalence study, focused on examining the prevalence of three AROs: methicillin-resistant Staphylococcus aureus (MRSA), vancomycin- resistant Enterococci (VRI), and extended spectrum Beta-lactamase producers (ESBL).

"Thus far there has been no province-wide baseline to understand the rates across all the homes, so the intention was to find a way to collect the data quickly and securely," says Dr. El Emam.

When contacted by Public Health Ontario earlier this year, Dr. El Emam and Privacy Analytics had already developed the prototype for a surveillance system. "We flipped it into a production system for use on a large scale," he says. The protocol was customized in a month and developed to allow participants to report without letting the conductors of the study know what they reported.

Asked to describe the solution, Dr. El Emam said it makes use of a system called homomorphic encryption. "We're using the kind of cryptography that allows you to do mathematical analysis on the encrypted data.

"We're able to collect encrypted data, perform calculations on that encrypted – not raw – data, compute the rates and aggregate it by regions, and bed size [number of beds), get the final results and then decrypt those," explains Dr. El Emam. In this study, he says, "We are not asking participants to trust us." By design, there was very little risk of being able to identify individual patients or homes. Instead, the system can pinpoint groups of homes with low or high rates by region or size of facility, but is unable to identify individual homes.

The original idea was to produce and analyze sensitive data for public health surveillance, says Dr. El Emam. Asked how long it took to set up the surveillance system, he said, "We were able to set it up very quickly. We were brought in a month before and knew we could set it up within a month. There was no paperwork. Since it was not a 'human study', but 'subject research', no ethics approvals were needed."

From October 17 to 21, 2011, participating homes were asked to share their current known numbers of MRSA, VBE, and ESBL positive residents.

Dr. Khaled El Emam, CEO, Privacy Analytics.

Participating nursing home representatives would use the system by simply typing a URL they were given into their browser and entering their responses. The values were encrypted using a special encryption method right in the user's browser.

Responses would be sent securely in an encrypted format to the servers used for the study at the McGill University Surveillance Lab, under the supervision of Dr. David Buckeridge, an assistant professor of epidemiology and biostatics at McGill, where he holds a Canada Research Chair in Public Health Informatics. The information was held there in encrypted form.

Average infection rates were computed on the encrypted values. An advantage for the participating homes, notes Dr. El Emam, is that they would also be able to benchmark themselves very quickly and compare their own rates to the aggregate – or average of other homes. At the time of publication, the results of the survey had not yet been made public.

This pilot test of the anonymous reporting surveillance system is already generating interest from other health agencies. "We're talking to some other public health units in Ontario, and hopefully also outside Ontario, eventually," says Dr. El Emam, adding that they now are being asked to use the system for tracking influenza and other kinds of infections.

In a crisis situation, such as a sudden flu pandemic or other health risk, this type of anonymous reporting would enable faster data collection, providing a quick big picture and breakdowns by regions.

Integrated voice

CONTINUED FROM PAGE 4

site. IVR can also have the added feature of collecting what was completed on the care plan (the tasks) with simple yes/no answers in the voice response system.

A simple IVR Time and Attendance Application would save all the paper being collected and stored and also provide accurate data automation in the office for payroll and billing purposes. Imagine not having to collect the paper, and not having to re-enter it into various systems for data processing.

Here's how it works. When the caregiver arrives or leaves a client's home, they simply call a toll free number from the client's home phone and enter their own personal ID number. The simplicity of the application allows even the least technically savvy staff members to automate their time and attendance. Proof of the visit comes from collecting the caller ID from the home telephone. The time data (when the call was placed) from the system is used for payroll and billing. Accurate time for each visit eliminates potential timecard fraud. The benefits of accurate timesheets can help agencies on many levels, including proactively managing visits via alerts in the system.

The agency will know if a caregiver has not shown up for an appointment versus waiting for the call from an irate patient/family that is waiting for the worker to show up. Alerts can be built into these systems based upon your agencies criteria. You decide if five or fifteen minutes is considered late.

Similar alerts can be setup for completely missing a visit, or for staying too long or not long enough. As the data is analyzed in the first month of using the IVR service, the agency might also find that they are able to add more client visits to each field staff member, increasing revenues while not increasing staff. So in this simplest of automation scenarios we have eliminated paper/manual processing and self-reporting. We have also improved accountability and now know what is really occurring in the field. Savings are realized with reduced paper costs, reduced data entry costs, reduced need for storage space, less errors in processing and reduced payroll expenditures from the elimination of the "rounded" timesheets.

Mr. Leigh Popov, chief information officer at Bayshore Healthcare, says: "IVR provides great ROI. It is by far the most cost-effective technology to help automate time and attendance collection in distributed organizations. It is easy to use, scalable, and highly reliable."

The visit functions of the workers can be monitored for safety purposes, timeliness, as well as accountability.

If you are looking for a better way to gain accountability and manage costs versus your manual paper process, you may want to ask yourself:

IVR is..."By far the most cost-effective technology to help automate time and attendance in distributed organizations."

- Could we be more responsive to our clients if we could manage staff and scheduling proactively?
- How many times have we lost the paperwork for a visit?
- Timely/Accurate payroll enhances worker relationships and minimizes turnover
- Do we know that the visits are occurring as planned, or do we feel we have too many late or missed visits?

These questions and the conclusions you gain from them may help your agency evolve by using IVR automation. That's something that just won't happen when you are collecting data with paper and manual processes.

Scott R. Herrmann is Director, Mobile Solutions for Procura. The company is based in Victoria, B.C. For more information, see: www.goprocura.com

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Infoway certification boosts credibility, attracts global partners

BY ROSIE LOMBARDI

For Dr. Wendy Graham, CEO of Mihealth Global Systems Inc, the value of achieving Canada Health Infoway's new certification cannot be understated, particularly from a competitive perspective. The Toronto-based firm's consumer health mobile application, called mihealth, recently received Canada Health Infoway's pre-implementation certification, which means the software meets Canada's highest standards for privacy, security and interoperability.

"I think certification has helped us grow. We're now being introduced to global partners that I don't think we would have met without the certification," says Dr. Graham, adding that certification helped boost potential sales during the recent launch of mihealth.

The subscription-based mihealth solution is currently being rolled out across Ontario, Quebec and Western Canada. It's designed to provide personalized patient-doctor interaction and communication on mobile devices, and features extremely high security and privacy protections. "Mihealth is a personal health record that allows bidirectional dual password protected secure messaging between patients, clinics and physicians," says Dr. Graham.

Infoway introduced its certification services two years ago to address some issues in the healthcare marketplace, says Trevor Hodge, senior VP of investment strategy and alliances at Infoway.

"Provinces and territories are making substantial investments in ehealth solutions across Canada. And while standards for privacy, security, and interoperability for these solutions exist, vendors have been slow to incorporate them in their products," says Hodge. "Also, buyers of these solutions haven't really made them mandatory in their procurement. So part of the reason to set up the program was to stimulate the uptake of standards-based solutions."


Trevor Hodge, Dr. Wendy Graham, and U of T's Kevin Leonard.

A specific trigger to launch a national certification service was the introduction of consumer health platforms such as Microsoft HealthVault and Google Health. "There were a lot of concerns about ensuring this new set of consumer health solutions met Canadian privacy and security standards," he says, adding that Telus, which is licensed to sell HealthVault in Canada, was the first company to achieve Infoway certification two years ago.

Infoway has since broadened its certification services to cover other types of software products in the healthcare space, including EMR, diagnostic imaging, drug information systems, and other applications.

Infoway certification provides a trusted seal of approval to potential buyers of these products, says Hodge. "It identifies, to the healthcare sector, that these products are compliant with national standards for privacy, security and interoperability. But we're not certifying features of the product or the company itself."

Certification involves a four-step process. "The vendor has to demonstrate to an assessment team that their product complies with these standards. We use a set of tests that include scripts and data, and they have to show that their product can meet 100 percent of our criteria."

Most of the assessment is done online, he adds. Infoway is familiar with most established healthcare technology companies, but if it's a new vendor, then there will be several face-to-face meetings to review company operations. "But the actual assessment of the product is all done virtually. The assessors aren't necessarily based in the same city so we use Webex extensively."

The certification term is for one year, and vendors have the opportunity to extend that for two consecutive years by completing mini-assessments in subsequent years. Every third year, the product needs to be re-certified with a full-blown assessment again to maintain its status. Also, if the product is materially changed in some way that impacts privacy, security and interoperability at any point, then a full-blown recertification is required.

"Certification costs vary depending on the type of product, but for the most part, it's in the $20,000 to $30,000 range," says Hodge.

After completing the process, the product receives a certification mark that vendors can display on their websites, product and literature. "Vendors get a positive benefit by having the Infoway brand associated with their product. And certainly, Infoway is well known globally, so this benefit extends beyond Canada to markets in the United States and Europe."

In mihealth's case, the application already met current legislated health standards in Canada and the United States, but achieving the Infoway certification provided even greater credibility with doctors and patients, says Graham.

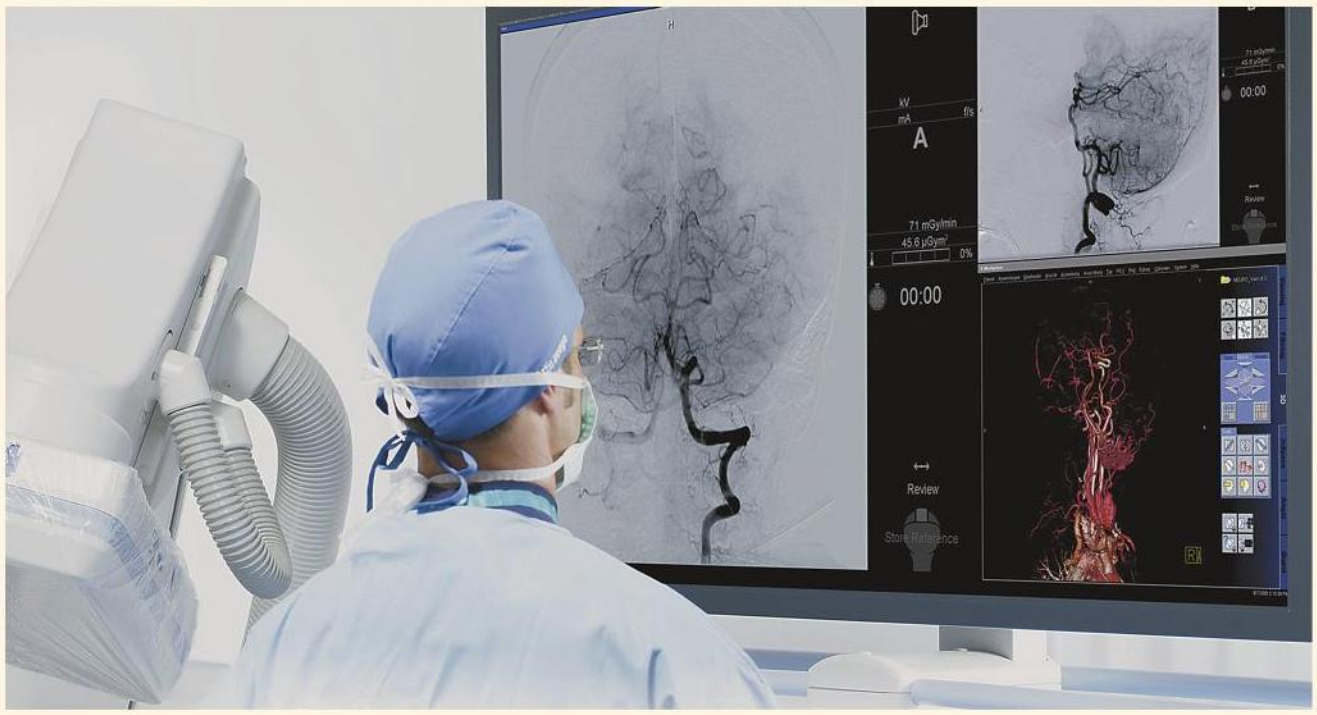
"We knew we were meeting extremely high U.S. standards, and that we were HIPAA compliant, but we wanted something that stated we met Canadian standards, too. It certainly made an important difference, I think, in terms of our credibility with our partners."

As a startup company, the competitive benefits of achieving Infoway certification outweigh the costs involved, she adds.

The actual certification process took about a year and involved regular meetings and stringent privacy, security and performance assessments of the product and overall business model. "It was a fairly intense process, in my opinion," she says.

Hodge says Infoway's target is to have another eight to 10 products certified in 2012, and to continue to build a critical mass of certified products. While certification is voluntary, it will increasingly become a key criterion to be eligible for Infoway and provincial investments. And many healthcare technology buyers are already starting to ask for Infoway certification in their RFPs.

Meeting standards will become an Infoway requirement in the future. "For the new investments that Infoway is doing over the next 12 months – all of those products that we would be directly involved in – we would want to have them certified. So companies such as MiHealth, Telus/Microsoft and others that provide consumer health solutions are demonstrating industry leadership by certifying their products," says Hodge.



Eizo monitor is optimized for operating room applications

Eizo Nanao Technologies' RadiForce LS560W monitor, part of the company's RadiForce series of medical display systems, has a 56-inch screen that is ideally suited for numerous OR applications. The system collects input signals from up to 21 different video sources, arranges this information according to customer demands, and then transmits this new combined picture to the 8MP monitor. The large viewing area and resolution provides imaging at a single glance and is approximately equal to six 1.3 megapixel (1280 × 1024) monitors without the distracting bezels. Placement and size of the source windows on the monitor are easily arranged – the flexibility in arranging and changing the size of the windows optimizes the workflow of surgeons. Important pictures can be scaled to the desired size and less important information can be moved out from visible area. Different workflow scenarios can be predefined and recalled on demand. A 60-inch is scheduled for release early this year. Eizo monitors are available in Canada through MegaTech, www.megatech-int.com

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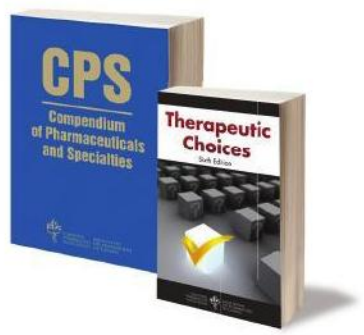

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Special Report

Canadian Healthcare Technology
March 2012

This month: e-referral systems

E-referral solution aims to improve flow of patients to specialists

By Dianne Daniel

Why are you here? Four words a healthcare specialist dreads asking and four words a patient – who may have waited up to six months for an appointment – dreads hearing. And yet it happens.

Perhaps the referring physician hasn't provided the appropriate information. Maybe the visit is premature because necessary preliminary tests have yet to be completed. Or it could be that after reviewing the patient file, the specialist has decided that he or she isn't the most suitable candidate.

It's about getting the right information into the hands of the right specialist at the right time and when you're relying on phone or fax, the process isn't always as efficient as it could be. But that's about to change, says Patrick Parato, Vice-President, Healthcare, at Toronto-based Navantis Inc. Parato points to recent developments in electronic referrals (e-referrals), a strategy that leverages ongoing investments in electronic health records to improve communication.

"I would say e-referral is going to be the number one healthcare application in about three to five years," says Parato. "E-referral takes the notion of the electronic health record and really allows care providers to start sharing information, but with context."

Still in the early stages of adoption, e-referral platforms are designed to streamline medical referrals by managing the data and workflow processes. Some solutions are hard-coded to a specific referral pathway, while others, like the Navantis AccessToCare Referral Framework, are designed to accommodate all types of referrals, including primary caregiver to specialist or hospital to long-term care facility.

One of the first to implement the Navantis AccessToCare Referral Framework is Ontario's South East Local Health Integration Network (LHIN), which is currently using the technology to manage referrals between two family health teams and nine specialists in the area of Kingston and Brockville, specifically for total joint hip and knee replacements. A web-based, collaborative solution that leverages Microsoft SharePoint and Dynamics xRM, the Navantis Framework integrates with the LHIN's existing electronic health record.

"There are significant benefits in choosing the Microsoft platform," says Peter Jones, Healthcare Industry Lead for Microsoft Canada. "Organizations see more value from these applications as they integrate easily into their current infrastructure. Customers can also leverage their technology investments to create new applications to meet their changing business needs."

All in all, a dramatic transformation has occurred. "We're going from what's a very manual process… to a timely exchange of information that captures the information needed for specialists to make the decisions they have to make," points out Todd Dafoe, the South East LHIN's eHealth Project Manager.

To make a referral for hip or knee replacement, primary caregivers within the participating family health teams click on an e-referral icon in the patient EHR. The Navantis application comes up on the screen, already populated with core information such as patient demographics and relevant clinical data.

As it continues to roll out its e-referral strategy, the South East LHIN is working with other Ontario LHINs, including Champlain and Central East, to outline the key components that make up a successful e-referral strategy. All three collaborated on an e-referral white paper – *Clearing the Communications Fog*, by Glenn Alexander, CIO of the Champlain LHIN – that they are now sharing with other groups across the country.

"E-referral takes the notion of the EHR and really allows care providers to start sharing information, but with context."

Patrick Parato, Vice President, Healthcare, at Toronto-based Navantis Inc.

Microsoft

BI enhances turnaround time in pathology reporting in Kitchener

BY DIANNE DANIEL

Waiting for pathology test results doesn't only create anxiety for patients. It can also cause strain in the hospital laboratory, particularly when it seems clinical staff can never get ahead of the reporting backlog and really don't understand why it's there in the first place.

But what if it were possible to pinpoint exactly where things were breaking down? What if staff members could identify problem areas at a glance and make real-time changes to increase workflow while reducing errors and ensuring high quality results and service delivery?

At Grand River and St. Mary's General Hospitals in Kitchener, Ontario, that what-if scenario is quickly becoming an evidence based reality.

The combined pathology service for both hospital sites is the first in Canada to use a business intelligence and analytics solution from San Francisco-based Viewics Inc., to augment workflow as part of a comprehensive "leaning" or six sigma exercise. Designed with the requirements of a busy laboratory environment in mind, the innovative software-as-a-service is supporting ongoing efforts to shorten the service's turnaround times and improve productivity and overall efficiency.

"We were not consistently meeting our patients' needs in terms of reporting our pathology testing results," says Vince D'Mello, administrative director, laboratory medicine, who spearheaded the lean project. "It was quite obvious to all of us that our current state was not sustainable."

"Staff were eager to move away from the status quo and support value-added process changes in the interests of improved patient care," says Shelley Owen, manager of pathology. "Without their involvement and dedication we could not have achieved this level of success in such a short time frame." There is now a clearer understanding of the relationships between the pre-analytical, analytical and post-analytical phases of the operations.

As part of its leaning exercise, the pathology service began to rely on visual measurement techniques to improve workflow, performing manual calculations each day and posting them on large white boards. The visual control of performance metrics is important, says D'Mello, because it alerts staff to react quickly to potential problem areas and variances in meeting desired targets.

After implementing Viewics' software-as-a-service, those manual updates will soon be replaced by digital dashboards. "The dashboard will have a combination of operational indicators, productivity indicators and quality indicators, which will help us to design or modify our workflow so that we're meeting our benchmarks," explains D'Mello, who operates under the mantra: "God we trust. Everyone else, bring data."

The Viewics' solution is a good fit for the laboratory, he adds, because it doesn't require any additional hardware or software, and most of the measurements on the lab's wish list are already provided in standard reports. It also removes pressure from the internal IT department, which would have had to develop custom reports in order to provide the same information on a daily basis. The operational team will have an authoring tool which allows them to easily slice and dice the data and perform root-cause analysis in the areas that matter most to them.

Viewics, on the other hand, operates as a third-party service. Rather than relying on back and forth queries with a hospital's existing information system, the analysis takes place in Viewics' proprietary cloud architecture using information "pulled" from the hospital database on a nightly basis. Although the company can pull any data from their system, they are aware of Canada's privacy legislation and therefore only rely on test-level data that is in no way linked to a patient's identity.

"What we do is very low touch on hospital IT departments and systems," says Viewics co-founder Tim Kuruvilla. "Given the SaaS model, Viewics takes the hosting, support, maintenance, and other heavy lifting off of IT. When a user runs an analysis, it hits our cloud computing architecture which is optimized to perform data analysis; it's not hitting their hospital information system and slowing it down."

Another advantage is that the user interface provided by Viewics is extremely user friendly. It incorporates drag and drop features and identifies variables using language that is familiar to the laboratory staff so that they can quickly create custom reports that interest them. For example, they can gain a better understanding of physician ordering patterns, quickly identify turnaround times that fail to meet a pre-set threshold, or examine health trends within specific patient populations.

"You can slice and dice through the data that matters most to you," says Kuruvilla. "When someone comes into the office in the morning, we want them to quickly see the five priorities they need to spend time on."

From the outset of its lean exercise, the pathology service at Grand River and St. Mary's set a goal of having 90 percent of all case types reported within five days and eliminating all backlogs. Prior to implementing the Viewics business intelligence solution, it was already well on its way to meeting both objectives and is now looking forward to setting even stronger performance targets based on the new information it will be able to glean once the service is fully rolled out.

"We typically receive from 150 to 170 pathology cases each day and in the pre-lean model we would have a minimum of 20 cases left over each day," notes D'Mello. "That backlog went down to zero."

The service is currently reporting 88 percent of its workload within five days, a number that used to hover at 52 per cent. And, in pre-lean days, 30 percent of reports were taking 10 days or more to leave the lab, a statistic that is now down to two percent.

Moving forward, the goal is to drill down to a more granular level of data to deliver even richer information so that further improvements can be achieved while raising the quality bar. According to D'Mello, the Viewics service is extremely knowledgeable about the inner workings and parameters of a lab environment; so much so that he and his staff will be able to innovate and measure things they haven't even thought of yet.

"When Viewics did the demo, we recognized they were ahead of the curve," he says. "…My vision is if this could be broadcast on every screen in real-time or as close to real-time that staff uses in the pathology department, we would all be aware at the click of a button where things stand."

While Grand River and St. Mary's Hospitals are the first to use Viewics in Canada, Kuruvilla has received significant interest after speaking at the Executive Edge Conference in Toronto last fall, and is also in discussions with other Canadian healthcare institutions.

Left to right: Dr. Dimitrios Divaris, Shelley Owen, Vince D'Mello.

GE and Microsoft joint-venture details

REDMOND, WASH., AND BARRINGTON, ILL. – General Electric Co. (GE), through its healthcare IT business, and Microsoft Corp. have announced several developments for their planned 50-50 joint venture. The new company, to be named Caradigm, is expected to launch in the first half of 2012, pending regulatory approvals and customary closing conditions.

Caradigm will be aimed at driving a paradigm shift in the delivery of care by enabling health systems and professionals to use real-time, systemwide intelligence to improve healthcare quality and the patient experience. Upon formation, the new company will develop and market an open, interoperable technology platform and collaborative clinical applications focused on enabling better population health management to improve outcomes and the economics of health and wellness.

The two parent companies bring complementary expertise to this new venture and will contribute intellectual property, including the following:

- Microsoft Amalga, an enterprise health intelligence platform
- Microsoft Vergence, a single sign-on and context management solution
- Microsoft expreSSO, an enterprise single sign-on solution
- GE Healthcare eHealth, a Health Information Exchange
- GE Healthcare Qualibria, a clinical knowledge application environment being developed in cooperation with Intermountain Healthcare (Salt Lake City) and the Mayo Clinic.

Interventional Radiology's quick advance means gains for patient care

BY DR. ROBERT ABRAHAM AND DR. JOHN KACHURA

Interventional Radiology (IR) has made tremendous strides for patient care over the past few years. IR is the subspecialty of Radiology or Medical Imaging utilizing minimally invasive techniques in the diagnosis and treatment of a wide range of diseases in many organ systems. Progress in IR has come about from significant improvements in technology and from novel techniques in the field. The treatment of peripheral vascular disease, large and small vessel aneurysmal disease, bleeding, hypertension, cancer, and many other conditions has been tremendously enhanced by this IR "revolution."

Not long ago, open surgical procedures performed under general anesthesia were often the only treatment options for patients with vascular disease processes such as femoral or tibial artery occlusions. Today, Interventional Radiologists are successfully treating these same patients by minimally invasive endovascular methods.

Shorter, less invasive IR procedures performed without general anesthesia on an outpatient basis have replaced major operations for many patients. Avoiding limb loss in patients with severe atherosclerotic disease is now a common outcome of IR procedures. One novel technique that is being used more frequently is subintimal angioplasty, the purposeful creation of a passage between layers of the arterial wall and then expanding this new pathway to allow needed blood flow to the legs and feet.

New metal springs or "stents" are now available to facilitate the maintenance of blood flow. The newest versions of these stents are coated with drugs such as Paclitaxel to inhibit forces like "intimal hyperplasia" from causing repeat narrowings, and studies have shown that three-year outcomes using such devices rival those seen with invasive bypass surgery. New catheters, wires, and other tools such as "re-entry devices" have helped to increase the success rate of such "revascularization" procedures and improve the lives of patients. Sometimes Interventional Radiologists can attack a clogged artery from both directions – from above the blockage, and also from below!

Newer, thin ("low profile"), "fabric" covered stents (or stent-grafts) are playing a major role in the treatment of traumatic injuries to blood vessels and in the treatment of thoracic, abdominal, and peripheral arterial aneurysms. Aortic aneurysms that previously required surgical procedures to prevent life-threatening rupture are now being treated percutaneously more often, with the increased use of closure devices that seal the device entry sites and of thinner, lower profile stent-graft delivery systems.

Sometimes Interventional Radiologists can attack a clogged artery from both directions – above and below.

In addition, patients with complex thoracoabdominal aneurysms involving mesenteric and renal arteries are selectively being treated with special stent-grafts that are fenestrated (have pre-formed holes in the graft material) or branched (have pre-formed arms), allowing the exclusion of dilated segments from the circulation to reduce the risk of aneurysm rupture.

Embolization, the blocking of blood vessels that feed diseased tissue or sites of bleeding, is another area of IR that has enjoyed continued progress. The use of embolization for traumatic bleeding (e.g. due to pelvic fractures) and for both benign and malignant tumours is increasing. Percutaneous embolization in such cases can save lives and reduce morbidity by avoiding major surgery.

Uterine artery embolization for symptomatic patients with uterine fibroids has become a main treatment modality, as patient satisfaction with this therapy is excellent. Intra-arterial catheter directed chemoembolization for primary liver cancer (hepatocellular carcinoma) has been proven to significantly improve patient survival. With the recent introduction of chemotherapy-eluting beads, chemoembolization can be offered to more patients safely and with less side-effects and complications.

Interventional Radiologists performing renal artery angioplasty and stenting for renovascular hypertension or renal dys-

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Wireless retrofits maximize lives of portable X-ray systems

TORONTO – Sunnybrook Health Sciences Centre has been a leader in implementing portable imaging systems throughout its facilities – and is now at the forefront of the conversion from CR cassettes to DR detectors for mobile exams. The hospital also has room-based DR systems installed in its ED and general radiology department.

In a critical care environment, seconds count. "Delivering high-quality images to physicians in seconds instead of minutes can greatly improve patient care, which is why portable imaging systems are so essential," said Henry Sinn, Sunnybrook's director of medical imaging. "The importance of instant image review convinced us to retrofit four of our existing GE AMX portable imaging systems with wireless DR detectors." Sunnybrook has a fleet of 10 portable X-ray systems.

The hospital selected Carestream DRX-Mobile Retrofit Kits, and integrated cassette-sized, wireless DRX detectors into three of its existing portable imaging systems that serve the ICU and surgical suite. These DRX detectors capture more than 70 portable exams a day.

"The DRX detectors met our institution's rigorous criteria for delivering excellent image quality, immediate image access and convenient wireless communication with our PACS," Sinn reports. "They were also extremely affordable and easy to implement."

Communication is accomplished in seconds as the detector transfers the image to the DRX system and that system then shares the image with the PACS through the hospital's wi-fi network.

Implementing DR detectors in mobile imaging systems used in the operating rooms earned immediate praise. "Surgeons appreciate the ability to view the image on the system's console in seconds. With CR, it often took 15 minutes for images to be available, which included technologists walking to a processing station and downloading the image from each CR cassette. We hope to enhance care by potentially reducing the duration of each surgery and the amount of time a patient is under anesthesia," Sinn explains.

Rapid image access is equally important in the ICU where physicians are placing PICC lines, breathing tubes and other clinical devices in patients, as well as following up on medical conditions using radiographic imaging. "With DR technology, physicians can make sure these devices are properly positioned while they are at the patient's bedside," he notes.

Carestream offers a unique Tube and Line Feature that reprocesses the original image (without requiring another exposure) to clearly display gastric tubes, feeding tubes, pneumothorax chest tubes and PICC lines, which are difficult to detect on a standard radiographic image.

Streamlining the imaging process also enhances staff productivity and ensures images are available when physicians make their rounds for ICU patients. With two DR portable systems, technologists can capture exams, verify image quality and positioning, transmit images to the PACS and move to the next patient in minutes. With CR cassettes, it often took an hour for each technologist to image five to six patients and have those images processed for reporting and viewing.

Converting to DR also means stat images for ICU patients no longer create imaging backups. With CR cassettes, a stat exam required a special trip to the CR reader for processing. This delay meant technologists struggled to catch up with other patient exams.

While speed is a vital asset, image quality is equally important. Sunnybrook uses anti-scatter radiation grids for 95 percent of its portable exams to enhance image presentation. The hospital also uses Carestream's enhanced DRX-1C cesium iodide-based detectors that offer exceptional image quality and improved DQE (detective quantum efficiency) when compared to the standard DRX-1 detector.

A DRX detector also has sufficient battery power to allow hours of exams to be performed before a battery needs to be recharged or replaced. The hospital has a multi-battery charger so fully charged batteries are always available when needed.

High-quality DR-based portable imaging is also deployed at Sunnybrook's Holland Orthopaedic & Arthritic Centre, which specializes in joint replacements and orthopaedic surgical procedures. Upgrading the facility's mobile imaging system allows rapid, high-quality bedside imaging for pre-surgical exams – which enhances care with a compact system that does not take up valuable space in this busy clinic.

While cost was not the primary concern, the ability to retrofit existing systems was a key advantage for the hospital's medical imaging department. "Being able to enhance the performance of an existing asset simultaneously helps us improve patient care and reduce costs," Sinn notes. "It would be very difficult to justify the replacement of mobile systems that have years of usable life. Retrofitting these systems with the latest image capture technology makes perfect sense."

Sunnybrook is one of Canada's premier academic health sciences centres and is an internationally recognized leader in research and education. Sunnybrook specializes in caring for Canada's war veterans, high-risk pregnancies, critically ill newborns, adults, the elderly, and treating and preventing cancer, cardiovascular disease, neurological disorders, orthopaedic and arthritic conditions and traumatic injuries. Sunnybrook has Canada's largest trauma centre and its cancer centre is the second largest in Canada and the sixth largest in North America.

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function caused by arterial narrowing now have an additional procedure in their armamentarium with the introduction of renal artery denervation. This procedure is being investigated for patients with idiopathic or essential hypertension, and the early results are promising. In this procedure, energy in the form of radiofrequency is delivered by a small catheter to destroy small nerves adjacent to the wall of the renal artery that mediate blood pressure. The first such procedure in Canada was recently performed in Toronto.

Direct image-guided treatment of cancer is being using more frequently and with a larger number of energy forms.

Direct image-guided treatment of cancer is being used more frequently and with a larger number of energy forms. Not only can small liver tumours be successfully treated with energy directed by small electrodes inserted through the skin, but more kidney cancers and lung tumours are being cured using this form of minimally invasive therapy. Radiofrequency ablation remains the most commonly used such method, but alternate technologies such as microwave ablation (thermal burning using microwave energy) and irreversible electroporation (direct damage of tumour cells using electrical pulses) are also being evaluated.

Not only are the tools and techniques of IR evolving, but imaging capabilities are also being advanced as well. For example, CT-fluoroscopy can help reduce the length of procedures such as biopsy or tumour ablation by providing virtual real-time visualization of the needle path and targeted tissue. New software is allowing computers to aid in needle guidance and to increase accuracy and reduce procedure time. Technologic capabilities of C-arm angiography suites continue to improve with the promise of increased patient safety and decreased patient discomfort.

Interventional Radiologists have become active participants in the clinical care of a variety of patients, offering services including consultations and follow-up visits, and in-patient admission when required. The future of Interventional Radiology is bright, and IR will continue to positively impact patient care and healthcare in general.

John Kachura, MD, is Associate Professor, Department of Medical Imaging, University of Toronto; Staff Interventional Radiologist, University Health Network & Mount Sinai Hospital, Toronto; and President, Canadian Interventional Radiology Association. Robert Abraham, MD, is Assistant Professor, Diagnostic and Interventional Radiology, Dalhousie University, Halifax, and a Board Member, Canadian Interventional Radiology Association.

Mobile app locates B.C. health services

VICTORIA – British Columbia has released a mobile application that allows people to locate a range of health services in the province using an iPhone, iPad or iPod. "We are combining government data with technology to make our health system easily accessible to a wide range of users," said Health Minister Michael de Jong. "Whether you're a tourist in your own province or a visitor from out of province, this app has important health information that is up to date and relevant if you need to quickly locate a walk-in clinic, emergency department or after-hours pharmacy."

The BC Health Service Locator app lets people find walk-in clinics, hospitals, emergency rooms, immunization clinics and after-hours pharmacies nearby. Mobile users can filter the results to view a particular type of health service, such as walk-in clinics, or view wheelchair-accessible locations.

The app uses Google mapping technology to locate local health services. The Province of British Columbia now has a designated area in iTunes App Store for the BC Health Service Locator app and any future iOS apps developed by the B.C. government.

To download the app, visit: http://itunes.apple.com/ca/app/bc-health-service-locator/id487323272?mt=8.

To watch a video on how to use the app, visit: http://youtu.be/HGy5P_lE6Zw.

The keyword search provides the opportunity to view results in different locations or find a particular type of health service. Details attached to the locations include the health service description, hours of operation, contact information and address.

Users can view the latest health alerts posted on the HealthLinkBC site from within the app, and have instant access to call 8-1-1 for non-emergency health information and 7-1-1 for hearing-impaired assistance. This app is designed for more immediate, non-emergency medical assistance and information. For immediate emergency help, it is best to always call 9-1-1.

Mobile users can filter the results to view a particular type of health service, such as walk-in clinics.

The BC Health Service Locator app was created by HealthLinkBC: it is available only through the iTunes App Store.

VIEWPOINT

Can activity-based budgeting save Canadian healthcare?

Having the right budgeting system in place can facilitate good decision-making.

BY RICHARD IRVING, PHD

Controlling costs in a sensible way – an issue that is common to all healthcare organizations. It's something they share with many other publically funded institutions, such as universities. While budgeting systems are not silver bullets that can solve all financial problems, having the right system can facilitate good decision making, while having the wrong one can make things worse.

Trying to make decisions regarding program cuts in the absence of accurate cost and revenue data is equivalent to an emergency room physician attempting triage without information about the medical condition of the patients.

When publically funded institutions receive money from governments, and funds are not specifically targeted, many institutions have traditionally used a fairly simple method of basing departmental budgets on last year's funding plus or minus some fixed percentage (usually plus).

This method has the benefit of simplicity and relative predictability. However, over time, departmental budgets may become inflated and cross-departmental inequities can develop. Furthermore, there is little incentive to innovate, except during years of cutbacks.

Even during cutbacks, a tendency to use across the board cutbacks (e.g., a 5 percent reduction in all budgets) is usually counterproductive in that efficient units are punished more than inefficient units.

One alternative approach to a simple formula-based approach is to use Zero-Based Budgeting, where each departmental budget is set to zero and the department has to justify whatever budget they need each fiscal period. This is conceptually attractive, but in practice it is not widely used in public institutions, where the bulk of costs (usually salaries) are fixed. Furthermore, it causes huge expenditures of time and effort every time an annual budget is prepared and often results in dysfunctional behaviour, such as hiding costs and overstating revenue expectations.

An alternative that is receiving significant attention in many public institutions is Activity Based Budgeting (ABB). ABB devolves both costs and revenues to the departments or divisions. They are then charged for central services such as space, heat light and common support services.

In many organizations, departmental chiefs don't have budgeting expertise; to switch to activity-based budgeting, they will need training and support.

Typically, a department receives the revenue it generates and is charged for all the common or centralized services it uses (e.g., heat, light, cleaning, etc.) The department or unit applies this revenue to departmental costs.

The ABB budgeting model devolves managerial responsibility to the departmental level. As well, the basis of institutional discussion changes from arguments about marginal budget increments (or decrements) to discussions about cost drivers (e.g., the number of tests ordered by a family practice unit) and internal transfer pricing (e.g., the costs of room cleaning).

The advantage of ABB is that it exposes the cost drivers for each department and puts pressure on departmental managers to manage them. However, ABB assumes that an organization either knows its costs, or can identify them clearly. In a hospital, where there can be intense interaction between clinical areas, allocating costs may be difficult.

Richard Irving, PhD, is an associate professor of management science in the Schulich School of Business, York University, Toronto. If you have comments or ideas on this topic, he can be reached at rirving@schulich.yorku.ca.

Furthermore, ABB puts pressure on departmental chiefs to budget, plan and manage wisely. However, in many professional organizations these chiefs don't have the management skills and may feel overwhelmed. Consequently, they will need training and support to make the transition.

Finally, changing the budgeting process takes time and a political process that encourages participation and buy-in from all levels of management. The estimates I heard are that it takes a year to understand how the process would be applied in a particular institution and to consult with the key managers.

It takes another one to two years to manage the transition to the new budget model. One process suggestion is that one must identify the general budgeting principles and get buy-in on those before discussing actual budget numbers. Otherwise the process will get bogged down in partisan bickering.

My bottom line is that I believe that ABB has the potential to reduce costs and improve service in the healthcare sector. By clearly identifying the costs of various services and procedures, better planning and management decisions can be made. These improvements will only be realized if the application of ABB to healthcare is well understood and if it is carefully implemented, with the inclusion of service-level agreements between departments and the central administration.

Real understanding requires activity-based costing

BY DR. JEAN MIREAULT

The traditional management methods used by manufacturing and service enterprises around the world are well known: production cost, cost accounting and budgets based on activity volume. In Quebec's healthcare sector, funding is based for the most part on a 20-year-old model.

Like many jurisdictions in Canada, Quebec uses global funding of hospitals – a lump sum is allotted to hospitals at the beginning of the fiscal year. In this model, hospitals are incented to perform fewer procedures; in this way, they are left with a surplus. Using activity-based funding, the impetus is to perform more procedures, as more revenue is generated.

But in order to switch to activity-based accounting, a hospital will need a different type of management information system, one that provides better insight into the true costs of procedures. In this article, we will examine some of the issues surrounding activity-based costing in Quebec's hospitals.

How can an institution that has witnessed significant population growth in its neighbouring territory in recent years be well served with global funding? The institution's activity volume is increasing steadily. Services provided to the public are growing at a faster rate than increases in its average budget.

In your opinion, will the institution be underfunded and operating in the red? The answer is most likely "yes". It will unfortunately be difficult for the institution to recoup its expenses and invest in service enhancements, because, according to the current definition of performance in Quebec, this institution will not be performing well. Is this institution being treated fairly? Still, if an institution were to be funded using activity-based costing, it would need to have far greater understanding and control of its costs. Does it have the following?

Dr. Jean Mireault

- control and management of the processes in place in the emergency department and operating rooms?
- patient pathways in relation to pathologies and their degree of clinical severity?
- variations in clinical practices?
- "return on investment" in terms of quality of care and productivity following the introduction of new equipment and new technologies?
- management of non-quality costs, e.g., readmissions and infections, and the cost of managing patients with chronic conditions?

Once these questions have been answered, an institution that was deemed to be deficient may in fact be found to be doing quite well.

Healthcare institution funding – an international perspective: Currently, a number of countries are operating on a funding model different from the one in use in Quebec. Those

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Streamlining hand-offs helps staff, families with continuity of care

BY GUILLE CRUZE

Earlier this year, my father had a heart attack. At discharge, while tired and stressed from being in the hospital, he and my mother were given 30 minutes of clinical, complex information detailing his post-hospital care and medication needs. Later, when they needed to recall the detailed discharge instructions, they each remembered the directives very differently, which could have resulted in inadequate, or even dangerous, care.

If a system such as Vocera Care Transition were in place, my parents could have called a dedicated, secure dial-in number and listened to a complete recording of the discharge instructions from the care provider.

Hand-offs are single largest source of medical errors: In the delivery of care, there is a daisy chain of communication events that are critical to the well being of every patient. Problems can occur when information is exchanged to bring patients, family members and caregivers to the same level of understanding throughout the care continuum, from admittance to discharge.

Industry sources cite communication breakdown during hand-offs as the single largest source of medical errors, and the root cause of more than 65 percent of sentinel events. Moments of dialog between care teams, specialists, family members and patients each represent a verbal care transition that, potentially, can be misinterpreted, misunderstood or forgotten.

Guille Cruze

A recent report from The Joint Commission Center for Transforming Healthcare stated, "On average, hand-offs are defective more than 37 percent of the time and don't allow the receiver to safely care for the patient."

There are many opportunities for communication errors to occur; it is human. However, with healthcare, the stakes are higher when it comes to mistakes and confusion. In 1999, The Institute of Medicine reported that as many as 100,000 Americans die each year from preventable medical errors, which opened the industry's eyes to the issue. And, in 2004, the Canadian Adverse Events Study found adverse events occurred in more than 7 percent of hospital admissions and estimated that 9,000 to 24,000 Canadians die annually after an avoidable medical error.

Since then, Medicare, the United States' largest insurer, decided not to reimburse hospitals for medical errors. This decision has influenced public and private insurers to do the same. Hospital re-admission statistics will also be a factor in reimbursement. Hospitals with high readmission rates are being penalized.

About 20 percent of hospitalized Medicare patients across the U.S. are readmitted within 30 days, according to a 2009 study published in the New England Journal of Medicine. Half of the patients never had a follow-up visit and developed complications, while others developed infections. Medicare currently does not reimburse hospitals when patients are readmitted within 30 days of discharge after a stay for heart attack, pneumonia and heart failure. In October 2012, penalties for other diseases will go into effect.

Solutions exist: Until there is a time in which patients leaving a hospital can actually have a Star Trek Vulcan mind-meld-like transfer of information with their caregivers to understand what they need to do to maintain their health, we need to monitor, measure and improve communication. We cannot assume communications have taken place. George Bernard Shaw said it best: "The single biggest problem in communication is the illusion that it has taken place."

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Chasing 'FRED' from the perioperative path

New workflow solutions are rescuing Operating Rooms from FRED – frantically running every day!

BY ANDY SHAW

Frantically Running Every Day – or FRED, for short – is the unlucky lot of more surgical staff than most hospitals would care to admit. Too frequently, nurses and others caring for surgical patients must go dashing to and fro picking up what falls through the gaps of a patient's entire "perioperative" surgical path – from admission through anesthesia and into the operating room; then on to recovery and discharge home. All along that often less than contiguous continuum is where FRED lurks.

But FRED is under attack like never before. At home and abroad, FRED's time-wasting, delay-causing, and even potentially life-threatening scurrying about is being targeted by new perioperative systems, notably ones that keep anesthesia, in particular, FRED-free. Battle plans for annihilating FRED range from a relatively inexpensive make-better-use-of-your weapons-at-hand approach to a budget-busting clinical information system re-armament.

Determined to put FRED on the run affordably, Sunnybrook Hospital in Toronto, for example, with the help of consultants from Connexall, is judiciously applying workflow technology and techniques to all parts of Sunnybrook's perioperative path.

"In effect, to eliminate the need for FRED as the nurses in particular call it, we have been helping Sunnybrook remove both their OR and surgical patient flow bottlenecks – so that people pretty much automatically have what they need when and where they need it, including both clinicians and patients," says chief marketing officer Mary Baum for Connexall, the Toronto-based workflow consultancy and communications integrator with over 600 healthcare, education, retail, and other clients worldwide.

"At the Disney Cancer Center in Burbank, California, for instance, we have been working with Disney's 'imagineers' to take a close look at how patients can better flow through the Centre. In particular, we're looking at how we give patients the ability to control their environment, including the temperature of the room," says Baum. "If you are going through cancer surgery and therapy, you likely don't have much hair on your head; so you often feel cold. The idea of you sitting in rooms where you are freezing and not able to even read a book or watch a film, but just sitting waiting for something to happen to you, as so often happens in hospitals, is not the kind of ideal environment that Disney is so good at envisioning and creating."

At the Disney Centre, cancer patients in waiting have a whole new set of attractive alternatives, including being free to go out for a walk and warm themselves in the Centre's lush garden. Thanks to the RFID tag the patient is wearing, no one has go out in a frenzied search for a missing patient.

Cerner Corporation, a market leader in clinical information systems, has what it describes as a "fully integrated anesthesia solution" installed at over 400 sites around the globe. It doesn't lose track of anybody. The anesthesia module is part of a Cerner's larger SurgiNet management solution, which stretches the full length of the perioperative process.

Cerner's SurgiNet modules offer automated help at critical points of the perioperative care path including:

- Scheduling, enabling staff to book both examinations and operating rooms before or at patient admission with the promise of reduced wait times, more timely use of staff, rooms, and equipment, and consequent reduced costs as well as fewer cancellations
- Case tracking, allowing staff along with patients' families to follow a patient's every stop along the perioperative process on large-screen, eye-level monitors hung on hospital walls
- Electronic Documentation, creating one record which transits the whole perioperative process with the patient from beginning to end
- Supply Chain, generating preference cards and pick lists for specific procedures that save time and effort including last-minute phone calls to find missing supplies crucial to the operation
- Anesthesia Management, providing automatically recorded, detailed anesthesia flow-sheet records for each patient from pre-op planning to post-anesthesia monitoring.

In reality, it has improved the accuracy of our charting … And really what the anesthesia record has done for us is to take better care of the patient," concludes Dr. Doug Arbittier, a happy Cerner user who is chairman of anesthesiology as well as head of perioperative services at the multiple-site WellSpan Hospital group in Gettysburg, Pennsylvania.

Meanwhile, iMDsoft in its stunning and continuing sweep through Europe, the USA, Asia, and even Australia, last year saw 50 major hospitals adopt various versions of its patented MetaVision perioperative care system, adding to the 45 client institutions world wide who signed on in 2010.

Founded in 1996 by Israeli entrepreneurs Phyliss Gotlieb and Dr. Ido Schoenberg, the now Massachusets-based iMDsoft sells, in effect, a longitudinal electronic medical record.

ILLUSTRATION: LINDA WEISS

"With MetaVision, we get a complete record of an anesthesia case from the pre-operative through the intra-operative and including the post-anesthesia care unit. So we get an accurate and comprehensive record that covers all the actions throughout the perioperative period," explains professor Dr. Azriel Perel, who chairs the Department of Anesthesiology and Intensive Care at the Sheba Medical Center in Tel Aviv. "But the other important aspect of such a system is that it improves the safety culture in the department. It makes every anesthesiologist feel more accountable for everything that goes on throughout surgery."

Including the unwanted FRED.

"In our hospital we use the MetaVision anesthesia information management system, which automatically collects vital signs; collects, lab results; collects various data that stream in from ventilators, from monitors, from IV pumps; and collects from the hospital information system itself – all this on a minute-by-minute basis," says Dr. Perel. "So we get a clear and complete picture of the patient's condition throughout surgery."

MetaVision's automated capturing of data, Dr. Perel further points out, has two other important benefits: physicians need spend less time manually

entering data and thus give more time to providing care; and it also makes for better decision making during surgery.

"It facilitates the recognition of any change in the patient's condition and it alerts us to potentially critical events throughout surgery," says Dr. Perel. "In fact, you can configure the system to provide alerts that can be administrative, physiological or guidelines-related."

One patient-safety alert, for example, that the Sheba Medical Center has put into its anesthesia system reminds its anesthesiologists to turn on other alarms after a cardiac patient is taken off bypass.

Cape Breton's Jim Maclean, however, has been working for years to counter the effects of 'frantic running' in the operating rooms.

"Going back to the mid-1990s at the Victoria General Hospital, we had a Dräger anesthesia information system installed called Clinidas and we were one of the first hospitals to use any kind of clinical information system," says Maclean, who is now IT project manager for Nova Scotia's merged Capital District Health hospitals in Halifax. "To be Y2K compliant, we upgraded in 2000 to another Dräger product called Saturn and that's when I came into the anesthesia picture. Then, after more than 10 years of service, we replaced Saturn with our third Dräger product called Innovian Anesthesia."

While Maclean and Capital Health have pioneered the use of innovative computer systems in and around the operating room, he says anesthetists are further ahead in this regard than many departments in hospitals.

"I find that when it comes to information technology, a lot of people in healthcare are stuck in their thinking when it comes to change, legacy thinking if you will. But I certainly wouldn't put anesthesia people in that category. They don't think that way. Indeed, I find they like to be on the cutting edge of technology," says Maclean.

Consequently, Maclean quickly won full anesthesia support when a change of database was proposed.

"We wanted to be able to do advanced reporting from our system. Our older system involved a Sybase database that was not easy to extract data from," explains Maclean. "In fact, it had over 100 million records stored in one table. So today if you queried that table – you'd come back and it would still be running tomorrow."

Now Capital Health is gathering its information on two readily-accessed SQL server databases including one dedicated to Innovian and looking at putting Microsoft Reporting Services in the middle to tie the main fields in both databases together.

One of the reasons, reasons Maclean, that anesthesiologists like to see information sources tied together is that they are literally faced with data staring at them every working day: "They see patient information coming off their patient monitors all the time and they understand that technically, its just a simple dump of that data into an information system and, Presto!, you have your patient record.

"That makes the record a true one you can audit. And in our case, we take a snapshot of data from the monitors every 15 seconds. So you can track in near-real time what's happening to the patient from an anesthesia perspective. That's something you could never do very well on a piece of paper with the doctor charting."

As with the MetaVision system in Tel Aviv, anesthetists in Halifax using the Dräger system can manually enter or "time stamp" the moment they administer any medication and then see what changes that subsequently made in the patient's vital statistics.

"And all of that is being recorded; so it delivers a huge benefit to the anesthetists," says Maclean. "They can concentrate more on watching how the patient is doing rather than staying heads down on their charting. Then at the end of the case, it is just a simple 'Print' and their part of the patient record is automatically pumped out full and complete."

Though the usage of Capital Health's anesthesia information system was already high – 95 percent of all cases were being recorded by anesthetists even with the less nimble Saturn system, reports Maclean – when Innovian was introduced in September 2010, word came down that all cases would be recorded and passed on to the Innovian database henceforth.

Complete records piling up one after

CONTINUED ON PAGE 22

New research OR will advance the practice of image-guided surgery

BY JANE FINLAYSON

The convergence of technology, innovation and new infrastructure to get health technologies into clinical practice faster is creating the next frontier for surgeons at University Health Network (UHN).

"We are in a perfect storm – improved high-tech imaging and tracking tools, collaboration across disciplines and a new operating room for clinical research – that enables us to develop new real-time imaging techniques, tracking and navigation to enable new ablative technologies in the operating room," says Dr. Jonathan Irish, chief of surgical oncology at UHN's Princess Margaret Cancer Centre.

Dr. Irish, who specializes in the area of head and neck cancer surgery, is leading the clinical research which will ramp up this spring in a new research operating room at UHN's Toronto General Hospital. The new OR – known as the Translational Research Imaged-Guided Operating Room, or TRIGOR – is where a multidisciplinary team of specialists will advance development of real-time, image-guided, minimally invasive and molecular-guided surgery to herald a new era of cancer surgery.

"Think of it as GPS for surgeons," says Dr. Irish. "With these technologies to help us navigate inside the body in new ways, we are able to spare healthy tissue, ensure greater precision, and deliver targeted therapies with fewer side effects. That's all very good news for patients."

Clinical research in TRIGOR is a key platform of the new Techna Institute, an innovation hub to integrate and accelerate research, development and commercialization of new healthcare technologies. Techna was launched in November, 2011 by UHN and the University of Toronto.

The purpose of the Institute – formally the Techna Institute for the Advancement of Technology for Health – is to bridge traditional research silos and entice experts from clinical, biomedical and bioengineering fields to collaborate and create biotechnical solutions for diagnostic and therapeutic challenges.

"Techna provides a process and framework to help innovation reach the patient and TRIGOR is an important testing ground," says Techna Director David Jaffray, UHN head of radiation physics and a senior scientist at the Ontario Cancer Institute, the research arm of the health network's cancer program.

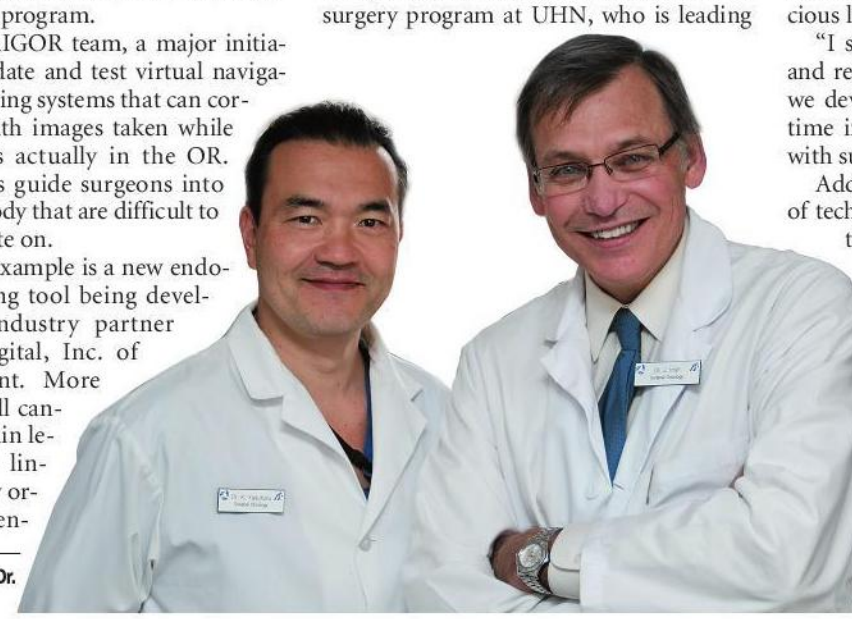
For the TRIGOR team, a major initiative is to validate and test virtual navigation and tracking systems that can correlate data with images taken while the patient is actually in the OR. These systems guide surgeons into areas of the body that are difficult to see and operate on.

One such example is a new endoscopic tracking tool being developed with industry partner Northern Digital, Inc. of Waterloo, Ont. More than half of all cancers start as thin lesions on the linings of hollow organs and endoscopy has a key role in diagnosing and assessing these tumours.

An endoscope consists of a tube (either rigid or flexible) with a light-and-lens system to view internal organs, body cavities and tissues. The new endoscopic tracking tool has a small but powerful digital sensor attached to the traditional scope.

Less than a millimetre in diameter – about the size of a pencil lead – the sensor links optical imaging (colour, texture, surfaces, boundaries of tumors) with information from other volumetric imaging such as CT and MRI. When clinicians overlay the endoscopic tracking data on scanned body images the result is a map to a previously hidden target.

For thoracic surgeon Dr. Kazuhiro Yasufuku, director of the interventional thoracic surgery program at UHN, who is leading lung cancer clinical research in TRIGOR, using navigation and tracking tools facilitates finding small nodules that need to be investigated but are often extremely difficult to reach because of where they are located on the lung bronchi or branches, which gradually get smaller and smaller.



Dr. Yasufuku and Dr. Jonathan Irish

"Virtual navigation helps us map the path to a nodule more effectively, and, when combined with advanced real-time imaging and minimally invasive techniques, helps us find and treat lung cancer earlier."

Dr. Yasufuku is researching technology, devices and techniques that he envisions may soon enhance the surgeon's toolkit in UHN's video-assisted and robotic thoracic surgery program. For example, he is marrying light sources and image guidance to find new ways to look "underneath" suspicious lung anatomy less invasively.

"I see a future where the virtual field and real field are seamlessly integrated as we develop more ways to integrate real-time information from multiple sources with surgery," says Dr. Yasufuku.

Adds Dr. Irish: "We are building a suite of technology-driven dynamic approaches that provide complementary ways of looking at all the needed information at the same time, in real time. This offers remarkable potential for improving the quality of therapeutic intervention and advancing our methods for treating cancers earlier and better."

Jane Finlayson is Senior Public Affairs Advisor at the Princess Margaret Hospital, part of the University Health Network in Toronto.

Simulation centre at St. Michael's to improve patient safety

BY NEIL ZEIDENBERG

TORONTO – What's being called the most advanced simulation facility in Canada – the Allan Waters Family Simulation Centre – part of the new Li Ka Shing Knowledge Institute, officially opened for business in late October at St. Michael's Hospital. It gives current and future health practitioners a chance to conduct research and become better doctors and nurses by using technology and highly-advanced mannequins.

"A simulation facility allows us to practice skills and learn new ones in a safe environment, so we can deliver better quality and safer patient care," said Dr. Patricia Houston, St. Michael's vice president of Education.

Beyond the financial contribution from the Waters family to build the simulation centre, St. Michael's also partnered with Johnson and Johnson Medical Co., Karl Storz Endoscopy Canada Ltd., and Cisco Systems Canada Co., which provided the leading-edge technology available throughout the Li Ka Shing Knowledge Institute.

Highlights of the 5,800-square feet facility include:

- A full-size OR where trainees experience real-life medical situations, learning to respond quickly and as a team; and
- A comprehensive skills lab where they can practice the latest surgical and diagnostic procedures.

The OR converts into a trauma suite, intensive care unit or patient ward and every effort is made to ensure trainees feel the same kinds of stress and urgency as they would in a real-life situation. This gives trainees hands-on training without any risk to an actual patient.

There's also a neonatal suite with mother and child mannequins where doctors can learn and practice their skills in treating smaller, more delicate patients in a safe environment. Pre-determined scenarios make it as lifelike as possible.

In the skills lab trainees learn minimally invasive surgical techniques, such as virtual laparoscopies, using the latest endoscopy equipment. But as Dr. Teodor Grantcharov, medical director of the simulation centre explained, it's not just for trainees. "Studies have shown that surgeons who have been away, even for as little as two weeks, perform far better after simulation training and make fewer errors." That means fewer complications for patients and less time on anesthesia. Moreover, he said before doctors get to work on real patients, they must show they possess the necessary skills. Computer stations throughout the lab help grade their efforts.

And with a skills lab situated next to the OR, St. Michael's Hospital surgeons can sharpen their technique prior to an actual surgery.

> **Studies show that surgeons who have been away for as few as two weeks perform better after practice sessions.**

The skills lab is also where I met Harvey, a cardiopulmonary patient simulator, who teaches docs to identify cardiac conditions (pulses, heart sounds and murmurs) at the push of a button. Harvey has been teaching bedside cardiac skills to health practitioners for nearly 40-years, and is known for his ease-of-use.

These amazing mannequins are from Laerdal (www.laerdal.com), a leader in healthcare simulation and training aids. The SimMan 3G, said to be the most advanced "dummy" on the market, has a pulse and heart beat, makes real breath sounds and responds to oxygen, fluids and CPR. Moreover, it responds to over 100 different meds; can ooze fluid from its ear, nose and mouth and can even cry.

The simulation centre also teaches:

- Telesimulation – treating patients at a distance over a secure network. Specialized audio-visual equipment allow procedures – real or simulated – to be broadcast anywhere in the world;
- Telementoring – using the Visitor1 robot, ORs can connect and communicate in real-time with a physician in-suite; and
- Telestration – a doctor at St. Mikes can guide another doctor in a remote location through a surgical procedure.

Elsewhere, in the Keenan Research Centre lobby, is what Cisco calls a Way-Finding station and Virtual Concierge. The Way-Finder helps visitors find their way to any place throughout the hospital using step by step instructions. If more personal assistance is required, visitors can engage the Virtual Concierge – a great idea for any large hospital where getting lost is a near certainty.

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CSTAR is training Canada's 'surgeons of the future' in London, Ont.

BY MICHELE MARTIN

LONDON, ONT. – A training program designed to prepare 'surgeons of the future' in the practice of minimally invasive surgery (MIS) achieved record high enrollment in 2011, and will continue to climb in 2012.

The London Health Sciences Centre, through CSTAR (Canadian Surgical Technologies and Advanced Robotics), has been conducting training courses in partnership with the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES).

Designed to give developing surgeons hands-on training in innovative cognitive and technical aspects of gastrointestinal endoscopy, video endoscopic and emerging technologies and minimally invasive techniques, the program enrolled eighteen surgical trainees from the University of British Columbia to Memorial University, and for the first time, generated a waiting list of surgical residents from across Canada.

The surgeons-in-training are enrolled in an intensive course on endoscopic surgery that includes expert lectures, hands on simulation training and technical skills assessment. Course attendees experience small groups and 1:1 instruction, as well as informal discussion with Canadian and international leaders in the field of minimally invasive endoscopic surgery.

"The particular focus of these SAGES courses is to expose trainees and motivate them to take a greater interest in endoscopic surgery," said Dr. Christopher Schlachta, medical director for CSTAR, and professor of surgery and oncology, Schulich School of Medicine and Dentistry, at the University of Western Ontario. "These are surgical techniques that use technology to offer patients surgery and interventions on their gastrointestinal system in ways that cause much less pain, suffering and complications by minimizing or eliminating the need for incisions."

All of the technologies employed in the training course are considered computer-assisted, minimally invasive surgery. When a patient needs surgery, the challenge faced by every surgeon is to perform that operation in a way that causes the least amount of injury for the patient, which will result in reducing pain and complications and allowing for speedy recovery.

One of the greatest sources of pain after surgery is the incision that a surgeon needs to make to get their hands and eyes into the patient to perform that procedure. Endoscopic surgery uses computer technologies to allow surgeons to perform operations with the same precision as they always have, but by avoiding the need to make big cuts.

Minimally invasive surgery will play an increasingly pivotal role in the Canadian healthcare system by enabling shorter hospital stays, lower infection and re-admission rates, a quicker return to normal for patients and lower institutional costs.

Based on clinical evidence and expert recommendation, a minimally invasive approach can be considered the best option in the treatment of many benign and malignant gastrointestinal diseases, particularly in areas such as colon cancer.

"The future of endoscopic surgery is very exciting," said Dr. Schlachta, "there is an explosion of computer-assisted technologies coming to market, from image-guided technologies to robotic surgery, that are going to continue to push the envelope further minimizing the trauma of surgery and improving recovery."

The greatest challenge with minimally invasive surgery is adopting the techniques and technologies, and then teaching them to our future surgeons. This is where the SAGES training course becomes very important.

SAGES have been a world leader in promoting the safe incorporation of minimally invasive technologies into surgical practice. Through the partnership between CSTAR at LHSC and SAGES we have offered seven SAGES courses to date and have four scheduled for 2012.

Michele Martin is a Communications Consultant at London Health Sciences Centre.

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CANADIAN Healthcare Technology

Chasing 'FRED'

CONTINUED FROM PAGE 17

the other in any easily retractable database also provides good fodder for reports and further research, Maclean points out.

"Our anesthetists are seeing such benefits from Innovian that they have hired an analyst to generate reports for them from it," says Maclean. "The reports are used to support their proposed research projects. For example, we've just recently had a research project proposed to look at what medications patients are on prior to surgery in order to see if there are complications that develop from each medication either before or after surgery. Also they can look at and compare the recovery rates for each medication."

Despite the relative ease of pulling such information together, privacy and confidentiality are watched over by the system, Maclean says: "You know who has accessed the record when, what they saw, and how long they looked at it. So you have auditing that is far better than any paper system can give you."

Also better is how Innovian and similar anesthesia systems can track who does how much work.

"Like a number of other hospitals, the physicians working here at Capital Health are not employees. So they bill the provincial government for the work they do," explains Maclean. "They use a third-party billing system meaning that every time they are finished in the OR, they fill in little slips of paper to bill for the procedures they did. But what we have been doing is comparing what they bill to what has been recorded on the Innovian system. And what we are finding is that they are not billing nearly as much as they should."

Small wonder then that anesthetists offer little resistance to such automated information systems or to expanding their use.

"We're currently exploring implementing Innovian Web Forms, which would allow us to capture data in the pre-op area," says Maclean. "So right now when the patient goes to pre-op and meets with the anesthetist, the information produced is captured on paper.

"Using Web Forms," adds Maclean, would enable us to provide the anesthetist with all that pre-op information electronically, whenever he or she walks into the operating room. Similarly we're working on getting that paper report that's automatically printed out at the end of the operation back into electronic format for inclusion in the patient's electronic record."

It's the kind of thing that comes with the all-encompassing systems provided by the likes of leading-edge, high-end vendors, for those that can afford them.

Healthcare needs more and better interfaces – interfaces that work with just about every other system in the hospital.

But more likely in Canada, where healthcare budgets will likely be eternally restrained, the expansion of automation to the full perioperative path and indeed to other processes in the hospital will likely follow Sunnybrook Health Sciences and Capital Health as models.

"Hospitals are still very much a collection of technology silos," observes Connexall's Baum. "So it is challenging work to fully integrate them."

To lessen the challenge, says Maclean, healthcare needs more and better interfaces – interfaces that work with just about every other system in the hospital.

"For instance, one of the things we are working on right now that our anesthetists are very keen about is an interface for lab results.

"So let's say a patient's lab results all of a sudden become available during surgery. A notice will come up instantly on Innovian in the OR, say with the patient's blood gas results, that are important to the care of that patient while under anesthesia," says Maclean.

"Interfacing like that has been growing for past 15 years. But it is going to continue to grow because it is the only way we are ever going to eventually have just one chart for one person."

Streamlining hand-offs helps with continuity of care

CONTINUED FROM PAGE 15

Finding ways to streamline patient hand-offs so there are fewer verbal transitions and opportunities for miscommunication and delays in patient care are critical. One way to achieve this goal is with systems, like Vocera Care Transition, which reinforce repeatable communication practices that include visibility and tracking of delivery and receipt of key messages.

Examples of streamlining hand-offs: For example, by deploying a care transition system, Ingalls Memorial Hospital (Harvey, Ill.) improved emergency department efficiencies, reduced the length of stay, increased emergency department volume and revenue and improved patient satisfaction. Similarly, El Centro Regional Medical Center (El Centro, Calif.), wanted to streamline and improve its emergency department transfers. The hospital has seen a 60 percent decrease in wait time and improved patient and nurse satisfaction scores since deploying a care transition system to process, track and monitor the flow of patients from the ED into in-patient care.

Conclusion: Patient directive solutions, such as Vocera Care Transition, capture and record communication events across the care continuum, so they can be retrieved later by authorized care providers, patients and family members. These systems provide streamlined and secure methods for sharing hand-offs and other patient directives.

Caregivers enter hand-off data at any time, using any device, through voice, data and text. Later, the patient and loved ones can retrieve the information over a secure phone line and/or computer and ensure they are following the discharge orders correctly.

Eliminating ambiguity and providing repeatable directives results in more organized care, which helps caregivers quickly identify patient issues and deliver better patient care. Systems that extend to patient discharge ensure patients and home care providers can access and repeat care directives from anywhere to reduce misunderstandings and errors.

Patients can retrieve information over a phone line or computer to ensure they are following discharge orders.

My father was fortunate in that he was able to reach his discharge team to ask questions and clarify his discharge instructions, avoiding a potentially serious medical error. Not all discharged patients are as fortunate. Technology cannot replace the human interaction, but it can facilitate the exchange and recall of information when a person may not be available.

Guille Cruze is Vice President & General Manager of Care Transition with Vocera Communications Inc.

Real understanding requires activity-based costing

CONTINUED FROM PAGE 14

countries, which include Australia, Austria, Belgium, the Czech Republic, Denmark, Germany, Hungary, Italy, Japan, New Zealand, Norway, Sweden and Switzerland, are all utilizing an activity-based funding approach. In a nutshell, under this model, healthcare institutions are paid for services rendered, and they can pocket any surpluses, i.e. profits, and reinvest them to improve patient care.

Sweden and Alberta: In 1993, Sweden moved from historical to activity-based funding. Over 15 years, local authorities noted an 8 percent increase in productivity in terms of in-patient care, a 50 percent increase in the number of day surgeries and a 15 percent increase in outpatient visits. Despite this significant increase in productivity, healthcare expenditures fell by 1 percent over this period. Since 2009, Alberta is the only province in Canada to have followed suit and implemented activity-based funding.

Meeting this challenge in Quebec: To construct all episodes of care and allocate all activity costs to patients, an institution's systems have to be interlinked, and episodes of care have to be built around a single key, i.e., record numbers. This is no small task, but we believe that MédiaMed Technologies – has succeeded at it.

MédiaMed Technologies: Activity-based cost experts: MédiaMed Technologies has developed MAGIC, a clinical information management module and decision-support tool, which combines a healthcare institution's financial and clinical databases. Its architecture by clinical activity sector facilitates the breakdown of costs by expense centre, thereby making it easier to conduct simulations and identify potential areas for improved performance. It is also becoming a critical tool for management agreements.

For 10 years now, institutions have been using this solution to view their clinical data from a single entry point. More than 14 institutions have already implemented activity-based accounting for all of their patient groups using this system.

Using MAGIC-based costing, managers can see the impact that various activities will have on patients.

The MAGIC-based costing solution allows managers to analyze, plan and simulate not only activities and resources, but also their impact on patients from a cross-sector and sector-specific perspective – a new management and performance enhancement approach whereby resources, services and clinical impacts are at last directly matched with an institution's patients.

In Quebec, hospitalization is currently measured using U.S. comparables as opposed to Quebec standards. Last year, MédiaMed Technologies launched a users' club, enabling institutions to compare themselves against each other, thereby generating the first Quebec standards for cost per episode of care.

Since MAGIC is connected to every information system in the participating institutions, it displays costs as well as all related data. MAGIC is opening up the field for clinical and financial performance, which is very closely connected to time use and procurement for each clinical service offering.

Examples from practice at the Sainte-Justine University Hospital Centre (UHC): In 2006, the Sainte-Justine UHC used MAGIC to draw up the operating budget for the Centre de cancérologie Charles Bruneau. This budget was based on actual costs. For funding of bone marrow transplants, the estimate based on "traditional" funding was $65,000. When MAGIC was applied, the average cost was actually $167,000, a shortfall of $102,000 per transplant, totalling $4.5 million for 42 transplant patients for 2004–2005.

Under the Grandir en santé [growing up healthy] project, the Sainte-Justine UHC and MédiaMed Technologies Inc. have partnered to develop a new budget simulation module for MAGIC to analyze and automate clinical cost calculations in the context of this modernization project.

The module has enabled Sainte-Justine to instantly generate financial data (costs) in response to changes in patient volumes and case mix, in addition to simulating costs associated with specific diagnoses or a multitude of cases. In addition, MAGIC has provided an overview of all the costs related to episodes of care.

Dr. Jean Mireault is Vice President of Clinical Affairs for Montreal-based MédiaMed Technologies Inc. The company's web site is at: wwww.mediamedtech.com

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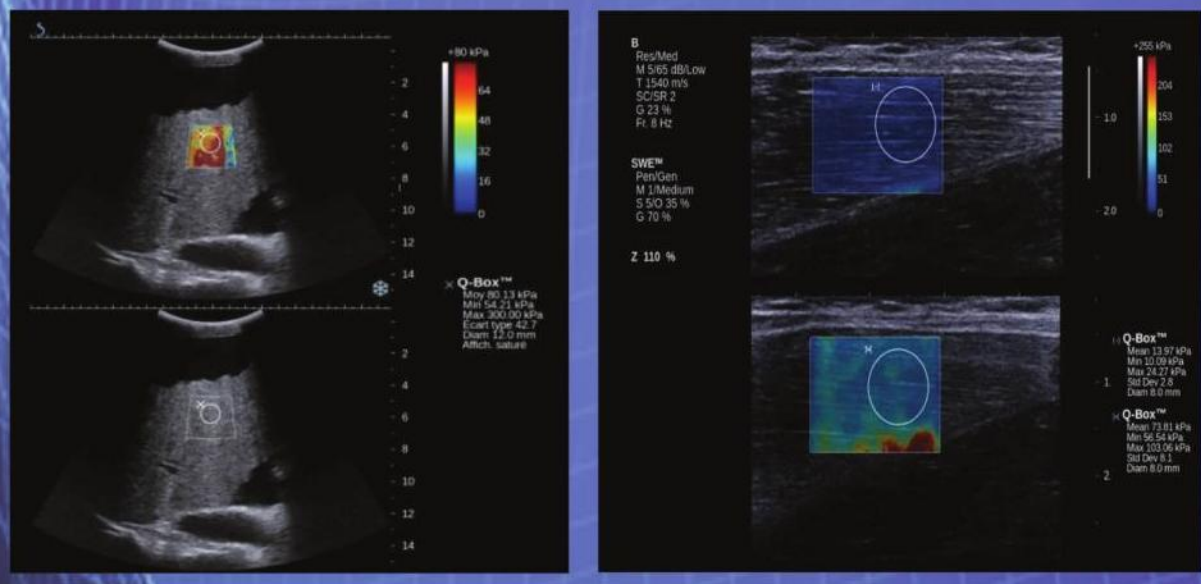

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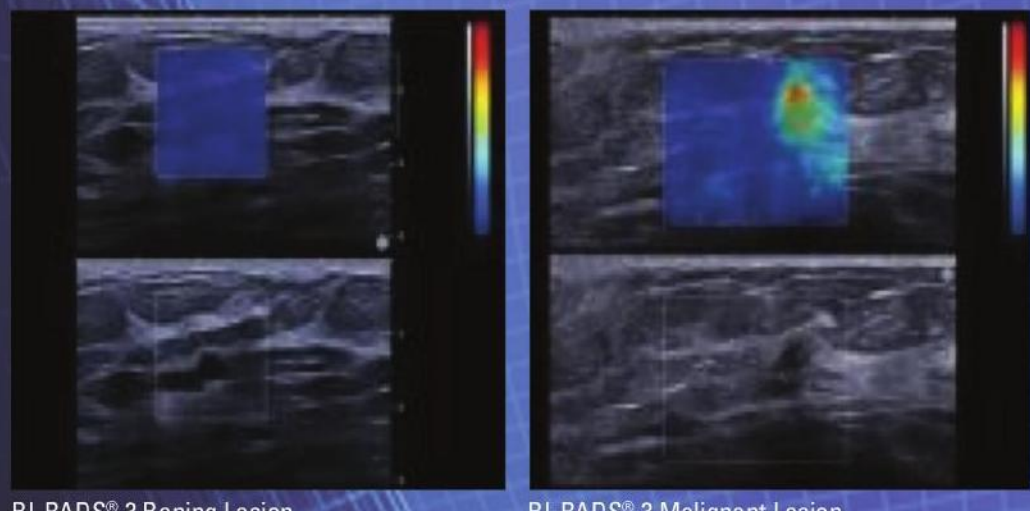

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