

CANADIAN Healthcare Technology

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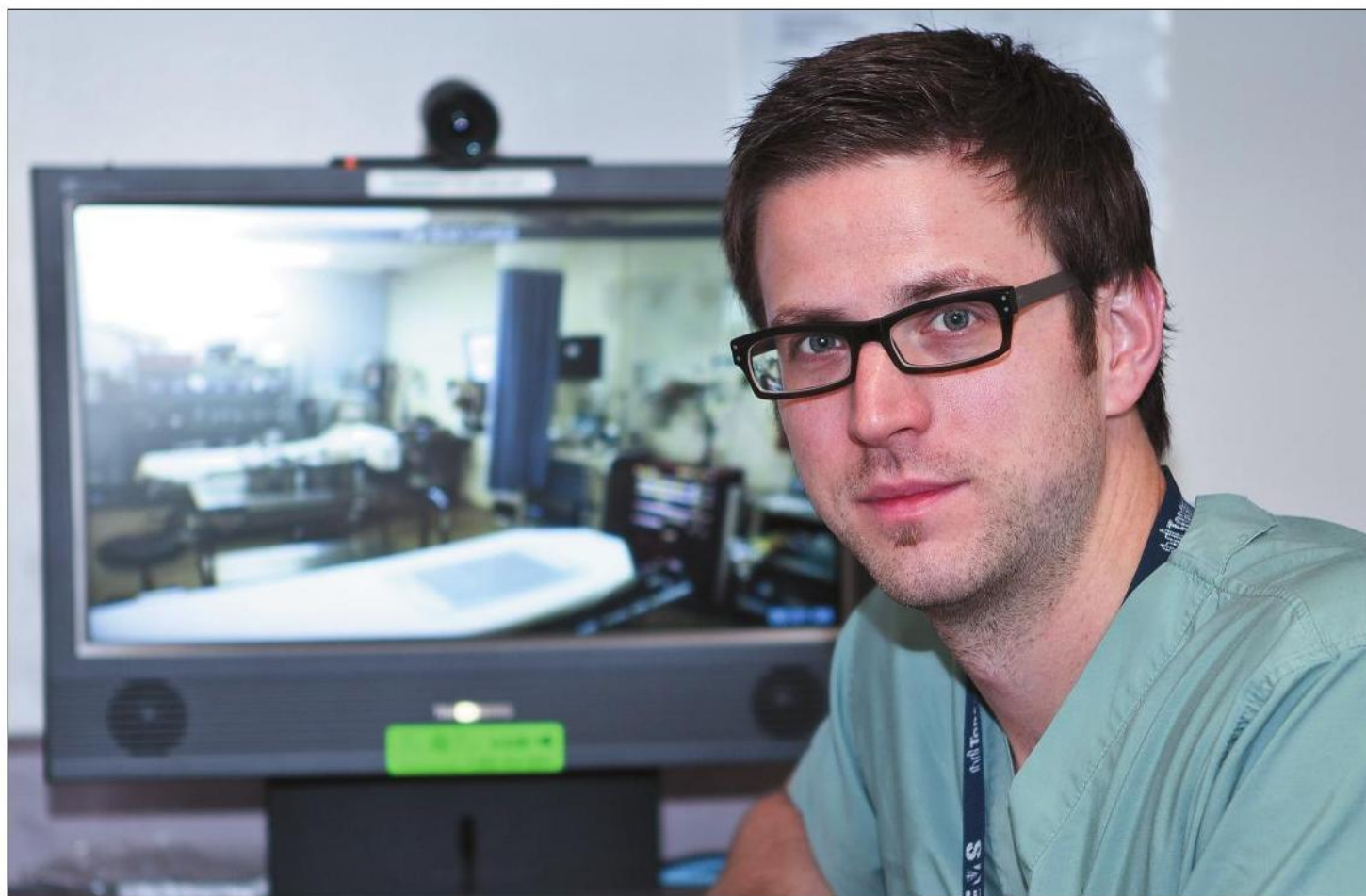


PHOTO: ST. MICHAEL'S HOSPITAL

Trauma experts use telehealth to support hospitals

The Toronto Trauma Telemedicine network enables emergency department specialists at St. Michael's Hospital and Sunnybrook Health Sciences Centre to connect via videoconferencing to five non-trauma hospitals in Ontario, providing remote support to physicians dealing with severe trauma cases. Pictured is Dr. Christopher Hicks, trauma team leader at St. Michael's and project lead for the network. **SEE STORY ON PAGE 4.**

Hamilton hospitals to monitor DI quality

BY SHELDON GORDON

Radiology and nuclear medicine specialists in Hamilton, Ontario will participate in a pilot project, starting in February, to check the quality of their reporting in real time, one of the first such pro-active, cross-institutional quality assurance initiatives in Canada.

Hamilton Health Sciences (HHS) and

St. Joseph's Healthcare Hamilton (SJHH), which have an integrated diagnostic services department, are running the project with software from Real Time Medical, a Toronto-based developer of solutions for the management of diagnostic imaging workflow.

The Real Time system can route a radiologist's report to another radiologist for a quality check – before it is trans-

mitted to the referring physician. The peer review is done anonymously – neither the radiologist nor the reviewer knows the other's identity.

The system is primarily designed to help radiologists and nuclear medicine physicians identify and correct any areas of potential improvement, while at the same time giving the patients the added safety of doing

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Hamilton hospitals to monitor quality of DI reporting in real-time

CONTINUED FROM PAGE 1

so in real time. A small but significant predetermined percentage of each radiologist reports are selected for review. When discrepancies are discovered, immediate action can be taken, and the correct results are then sent to the referring physician. As well, the system provides a real time educational opportunity in allowing the radiologist or nuclear medicine physician to identify areas of improvement and acquire additional knowledge.

HHS and SJHH are affiliated with McMaster University's Faculty of Health Sciences. Together, they employ the hospital sector's 60 radiologists and nuclear medicine physicians, although the pilot project will involve a smaller number of radiologists and nuclear medicine physicians initially.

"Our ultimate goal is to establish a city-wide Diagnostic Services physician quality assurance program that will contribute to and improve the quality of Hamilton's medical and molecular imaging services," says David Wormald, integrated assistant vice president, diagnostic services and medical diagnostic unit at HHS and SJHH.

While there is no consensus in the radiology literature, some studies suggest a typical "clinically significant discrepancy rate" of 3 percent to 5 percent, based on retrospective quality assurance checks, and while the Hamilton organizations lack data on their own error rate, Wormald says he has no reason to think it's out of line with professional norms.

"That's why setting up this project will allow us to have a better understanding around using a quality-based feedback system that would allow us to actually start to track and monitor" discrepancies, says Wormald.

When the pilot is completed at the beginning of May 2013, the results will be assessed with a view to a permanent program in Hamilton. Moreover, says Wormald, "It would help us inform a potential solution that could be used not only across our LHIN (Local Health Integration Network) but potentially as a provincial solution."

"We've had some early discussions with key stakeholders in government, and they're very interested in our pilot and potential outcomes. We'll be looking to present that to them," he says.

If the outcomes are promising, HHS and SJHH may, by next autumn, issue a Request for Information (RFI) to canvas the marketplace for potential vendors and obtain a reading on price. Real Time Medical has provided its DiaShare software for the pilot.

Real Time Medical would have to tender alongside other suppliers in a Request

for Proposal (RFP) process if a permanent quality assurance program is established. Wormald notes of the Real Time solution that "the product they're offering is unique in the marketplace."

Whereas other software may identify discrepancies retrospectively, DiaShare does so in real time. "The peer review system allows us to get prospective and timely feedback, so that if there is a discrepancy, it would be identified before the report is actually issued and could be corrected," says Wormald.

Besides providing real-time quality assurance, DiaShare can "load balance" among radiologists. If there are, say, 100 exams waiting to be read, the system would allocate them among the available radiologists. It can send certain imaging exams to the radiologist best qualified to read them – e.g., infant X-rays to a pediatric radiologist.

If a radiologist is busy or behind schedule, their exams can be re-directed to a radiologist who is more available. That allows the reporting to be done quicker, which means that treatment of the patient can start sooner.

Ian Maynard, co-founder and CEO of Real Time Medical, notes that, historically, "the systems in place weren't designed to address workflow issues, only data storage and display. A radiologist could be tied up in a complex case, and their in-box would fill up. Now, depending on the urgency of the other cases, the backlog could automatically be reassigned to another radiologist."

He points out that the load balancing ca-



David Wormald, assistant VP at HHS and SJHH.

pability is itself a major contribution to quality reporting in radiology. "It's often workload and fatigue that contribute to potential errors." Several provinces have taken steps to address radiology discrepancy rates in recent years. "It's a common issue anywhere radiology is practiced," says Maynard.

In October 2009, New Brunswick's Ministry of Health hired Real Time Medical to review all the reports of one radiologist since 2006. "We deployed 26 radiologists to review two years' worth of examinations in three months," recalls Maynard. The investigation, which involved 30,000 imaging examinations, found the radiologist's discrepancy rate was about 16%.

In 2010, Real Time Medical was hired by health authorities in Newfoundland and Labrador to do a quality assurance review of four radiologists and about 5,200 cases.

In August 2012, B.C.'s Ministry of Health ordered an investigation of thousands of medical scans, including CT scans and ultrasounds, performed in B.C. hospitals after errors by three radiologists at separate facilities were discovered. The ministry announced on December 11th that it had selected Atlanta-based McKesson Corp.'s QICS software for a peer-review quality assurance system for the province's radiologists. Real Time Medical was the second of two shortlisted vendors in the RFP process.

The Vancouver Island Health Authority (VIHA) will roll out McKesson's software in the first phase of the program, which will involve 200 radiologists. Later, at full scale, the program will be the single largest cross-institutional initiative of its kind in North America.

"Conducting peer review of radiologist reports is challenging, particularly across distinct infrastructures, hospital systems and PACS [that] we have throughout our province," says Dr. John Mathieson, the Authority's medical director, medical imaging, in a news release. "[For] the first time we'll have the ability to run a comprehensive, province-wide quality improvement process, and be able to make some valuable changes that will result in better reporting of imaging studies."

B.C. taps McKesson QICS by peerVue for DI quality check

VICTORIA – The British Columbia Ministry of Health has selected McKesson as vendor of choice for its radiologist peer review initiative, the single largest cross-facility initiative of its kind in North America. As part of its ongoing quality improvement program, the Ministry of Health will use McKesson QICS for Radiologist Peer Review in a pilot to help modernize medical imaging processes and improve quality of care.

The Vancouver Island Health Authority will be first to roll out McKesson's solution as part of the initial phase of the program, which includes more than 200 radiologists. In later stages, this provincial project will span a region that is 1.4 times larger than the state of Texas and involves radiologists reviewing more than 3.5 million exams conducted annually.

McKesson QICS for Radiologist Peer Review allows organizations to monitor the entire imaging review process, and inte-

grates with multiple picture archiving communication systems (PACS) to support cross-facility peer review. The pilot will demonstrate the ability for a case that is initially read by a radiologist, at one health authority, to be peer reviewed anonymously

The province-wide roll-out will occur first at the Vancouver Island Health Authority, which has more than 200 radiologists.

by a radiologist located in a different location and on a separate PACS.

"Conducting peer review of radiologist reports is challenging, particularly across distinct infrastructures, hospital systems and PACS we have throughout our province," said Dr. John Mathieson, medical director, medical imaging, Vancouver Island Health Authority. "By choosing

McKesson for this initiative, for the first time we'll have the ability to run a comprehensive province-wide quality improvement process, and be able to make some valuable changes that will result in better reporting of imaging studies."

McKesson QICS for Radiologist Peer Review offers real-time reviews in a fully automated regulatory compliant solution, integrating to existing technology and augmenting existing workflow. The system's unique rules engine intelligently selects the exams to be reviewed and routes them to the appropriate radiologist based on subspecialty.

In the past, a peer review would occur days or weeks after a radiologist writes a report. With McKesson QICS for Radiologist Peer Review, the review can occur before the radiology report is sent to the ordering physician, so any necessary intervention or corrections can be made in a timely manner.

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HSC creates time-saving electronic solution for post-partum unit

WINNIPEG — A home-grown system for automating the collection of critical patient information at the Health Sciences Centre has dramatically reduced the paperwork for nurses, freed up time for additional patient care at the bedside, and has provided patient safety benefits.

Heath Sciences Centre (HSC) is a large 750 bed tertiary teaching hospital which serves patients from Manitoba, Northwestern Ontario and Nunavut. It is currently implementing a Lean initiative to reduce costs, improve efficiency and increase patient safety.

Susan Harrison, manager of the Family Centred Mother and Baby Unit, a busy post partum unit, and Shauna Mason, clinical resource nurse, enrolled in the lean training being offered by HSC in November 2010 and immediately identified patient information gathering as the first lean project they would tackle.

At that point, the reporting system consisted of nursing staff collecting critical patient information on note paper. When they returned to the nursing station, they would hand copy data from their notes to a large whiteboard as a reference for other caregivers.

At change of shift, incoming nurses would copy patient data for their patient assignment on their own notepaper for their reference. At end of shift, they would again update the whiteboard. Additionally, selected information for all admitted patients was then transcribed to a summary report for use by the manager of the unit, the clinical resource nurse or charge nurse who needed it readily available while making rounds on the unit.

Obviously, there was a lot of manual data collection and transcribing, which is a less than ideal use of nursing resources. The more critical issue was the very real potential for transcription errors and/or omissions that could adversely affect patient safety.

Using their lean training, Harrison and Mason created a report which documented the problems and potential solutions.

The proposed solution was to purchase or develop a standalone database program into which staff would enter data. While potentially an improvement over the existing process, a lot of effort would still be required to enter patient names, their bed locations, and maintain the patient list when discharges occurred. There had to be a better way.

Harrison approached HSC's Health Information Services department for help, where she learned that a similar project was already in progress. This other project had established a real time feed from the hospital Admissions, Discharge, Transfer (ADT) system, which would automatically populate the patient name and demographic information into a database. All that was required was to modify the existing program to collect the data elements that the Family Centred Mother and Baby Unit required.

Brett Wasny, from the decision support department of HSC and Michael Zhang from the Winnipeg Regional Health Authority (WRHA), were assigned to work with Harrison and Mason to turn this project from an idea to a reality.

Harrison and Mason worked with their staff to confirm and clarify the essential information that was needed for shift to shift reporting, as well as what was required for managers and charge nurses. This was sent to the design team, who built a prototype using MS Access to facilitate rapid development of the database application. Once the specifications were documented, they were handed over to Zhang and his computer science students from the University of Winnipeg to program a web based solution.

The staff met regularly to discuss the project and

provided valuable feedback as the work progressed. Involving front line staff in a meaningful way during the design and development phases created buy-in and enthusiasm for the project, which was critical to maintaining momentum while the inevitable bugs were worked out.

The HSC Foundation provided a \$5,000 grant, which allowed the team to pay the students a modest stipend for their work

Thanks to the new system, five to nine hours of nursing time is saved per shift, freeing up nurses for other tasks.

on creating this application. From the first meeting to go live took about 15 months.

The limited budget meant we were at the mercy of the availability of our computer science students (who were doing the bulk of the programming). They took time from their studies and other commitments to work effectively for free, which we obviously appreciated, although a couple of them had the temerity to leave the project part way through to get real paying jobs!



Members of the electronic nursing information project: Frank Kozmet; Susan Harrison; Brett Wasny and Shauna Mason.

Now, nurses can log into the system, quickly update information and generate patient list reports to use during their shifts. Less time recording data manually means more time at the bedside providing care. The manager/CRN are happy too, since they can print off summary reports for their reference when rounding with physicians and other health professionals.

This program has expanded to include interdisciplinary team members such as support staff (modified work sheets for their needs), to the social workers and nurses in the Breast Feeding Service seeing this patient population. Roughly 85 staff members are benefitting from the new system.

The breadth of the information captured electronically is impressive. In addition to basic demographic information like name, age, hometown, and attending physician and current bed location, nurses enter data about the mom's allergies, information about the delivery (date/time, type of delivery), test results for RH, HIV, Hep B, Rubella, and they have a 500 character note field for more detailed descriptions.

For the babies, we collect gestational age, apgar score, birth weight and current weight (weight loss % is automatically calculated), feeding status, blood glucose and bilirubin levels, baby location (whether they are on the ward, NICU, etc) and a 500 character note field as well.

In short, this project has increased nurse productivity, improved patient safety, improved shift to shift communication on WRS3 and has laid the foundation for the development of other data collection and reporting systems at HSC. We estimate about 5-9 hours of nursing time is saved per shift, or about 1.8 eft worth of time that is freed up for more value added tasks. Moreover, the system eliminates the issue of handwriting legibility, which is an important patient safety concern.

Tele-trauma network provides expertise to many remote hospitals

BY SHELDON GORDON

TORONTO — A first-of-its-kind tele-trauma project is enabling a small group of emergency experts to assist remote hospitals when patients come through their doors with serious trauma, including gunshot and knife wounds. The specialists may soon be equipped with iPads or other tablets that allow the viewing of patient images and videos wherever the physicians happen to be, and to provide advice and coaching at a distance.

Currently, the Toronto Trauma Telemedicine (3T) network enables emergency department specialists at St. Michael's Hospital and Sunnybrook Health Sciences Centre in Toronto to

connect via video-conference to five non-trauma hospitals in Ontario, providing remote support to physicians dealing with severe cases and expediting transport to a trauma centre.

The project was originally launched at St. Michael's in 2010. Several trauma specialists initially were on call weekdays from 8 a.m. to 5 p.m. The Toronto Trauma Telemedicine coverage was expanded to 24/7 in October 2011 when Sunnybrook joined. There are now 10 trauma specialists participating.

"Any time we talk about this with another hospital that doesn't do a lot of trauma, they say, 'What a great idea, We'd like to have that support available to us when we deal with our trauma patients,'" says Dr. Christopher Hicks, trauma team leader at St. Michael's and

project lead for the 3T network.

The project started with three non-trauma hospitals participating, and an additional two hospitals were subsequently added. The referring hospitals are Peterborough Regional Health Cen-

The 3T network provides invaluable support to remote hospitals that don't see many serious trauma cases.

tre, South Muskoka Memorial Hospital, Huntsville District Memorial Hospital, Humber River Regional Hospital (at two sites) and The Scarborough Hospital. Three more non-trauma hospitals are being prepped for early addition to

the system, says Hicks.

The system was developed with input from the Ontario Telemedicine Network (OTN), and relies on desktop computers for the consulting MDs. The referring hospitals are equipped with "interns" — mobile terminals that can be moved to the patient's bedside and have cameras that can be zoomed in and out remotely to show the patient's injuries.

The trauma telemedicine idea is modeled on Ontario's 10-year-old Tele-Stroke Program, which maintains a neurologist on call to provide advice on the treatment of all stroke patients in the province who have initially been brought to a hospital that lacks the expertise to administer clot-busting drugs. Like a stroke, trauma is a very time-dependent

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Brantford General Hospital entrusts technology to help deliver excellence in breast cancer patient care

Patients and clinicians alike are celebrating the arrival at Brantford General Hospital of GE Healthcare's innovative SenoBright technology — the first of its kind in Canada.

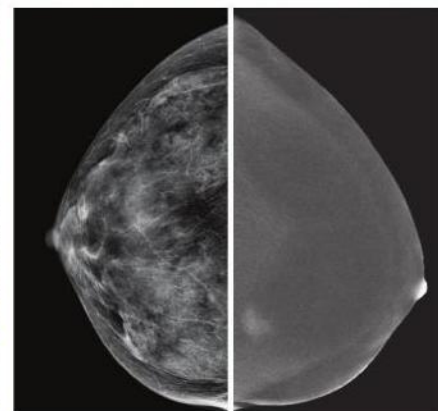
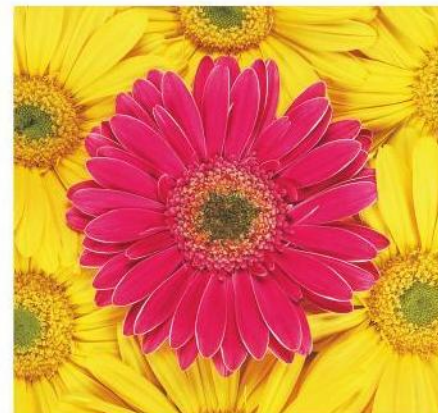
Launched in 2010, SenoBright is already in use at numerous major mammography centres in the United States, France, Spain, Italy, Belgium, Germany, Austria, and Japan. SenoBright uses X-rays at multiple energies to create two separate but almost simultaneous exposures.

The system makes use of Contrast Enhanced Spectral Mammography (CESM) technology, which produces contrast-enhanced images of the breast using an x-ray contrast agent and a dual energy acquisition technique.

"We are very excited to launch the innovative CESM technology at the Brantford General Hospital. We are the first site in Canada to do so."

"We are very excited to launch the innovative CESM technology at the Brantford General Hospital. We are the first site in Canada to do so. It will be a tremendous benefit to our local breast imaging program in assisting with the workup of complex mammographic cases," said Dr. Azra Khan.

Worldwide, more than 1.2 million people annually are diagnosed with breast



cancer. Since 1965, GE Healthcare has made significant progress in providing solutions for breast cancer detection and diagnosis that really bring a change to people's lives. Today through "healthymagination", we continuously develop innovations to reduce costs, increase access and improve quality and efficiency of healthcare.

Same staff, same equipment – same day

CESM technology is intended to work as an upgrade to GE Healthcare's Senographe DS and Senographe Essential digital

mammography equipment. SenoBright enables a procedure to be conducted by the same staff, using the same mammography equipment, potentially on the same day as a traditional screening exam, thereby helping medical professionals to cut the critical time patients often have to wait from detection to diagnosis. GE Healthcare estimates that 2,500 digital mammography systems upgradeable to SenoBright are in clinical use today – delivering an excellent investment for these customers – and providing added functionality to an existing and vital tool.



Health Unit uses café to engage staff in electronic record strategy

ROSS GRAHAM & RICK SHANTZ

When the Middlesex-London Health Unit (MLHU) decided to develop an electronic client record (ECR) system as a strategic direction in 2011, the organization came up with some innovative ideas. First, the term 'ECR' was chosen instead of 'electronic medical record' to better represent the Health Unit's broad range of programs and services.

As one of Ontario's 36 public health units, the Middlesex-London Health Unit (MLHU) delivers a variety of important programs and services that prevent injury and illness, protect and promote optimal health, and in turn, reduce the burden on the healthcare system. This includes immunization, emergency preparedness, restaurant and premise inspections, prenatal and family health, as well as chronic disease, injury prevention, and tobacco control.

Next, the committee overseeing the strategic direction tried a new approach for engaging and gaining staff input on the ECR strategy: An ECR Café.

The Café was held on a Friday morning with close to 60 staff, including management, administrative support and front-line representatives from each program team. In a nutshell, the Café included a group activity to kick-off the process, staff rotating through four different activity stations, and a final group activity to wrap up the event.

"We all know staff input and engagement is so important for a project's success," said Alison Locker, epidemiologist and committee member. "We thought the Café approach would offer a new and fun way of gaining staff feedback, without hav-

ing to sit through long focus groups or completing lengthy surveys."

As a group, the participants first received a brief orientation to ECRs, learned the results of an external scan and received instructions on the Café process. In his opening comments, Rick Shantz, the director of I.T. and committee chair, set the expectation that "today is not only about information gathering, it's also about getting together across all programs and thinking collaboratively about how an ECR can impact how we do, and what we do."

The participants then broke into small groups with their teammates for a process-mapping exercise, where they were asked to map one of their team's service delivery programs. The process-mapping exercise led staff to reflect on how client information flows through their program, as well as how this information moves to

other MLHU programs or external partners. It also primed staff for the more in-depth questions at each of the upcoming rotation stations. Committee members were available to assist if teams had questions during the process mapping activity.

Teams were then provided with a rotation schedule through the four activities stations (see chart, 'ECR Café Stations.')

Each rotation lasted 25 minutes and while staff remained with their teammates, teams were grouped differently at each station in order to enhance cross-organizational learning and interaction. This was

important because some MLHU programs still use paper client records while others have plenty of experience with electronic documentation. Some of the programs have devised homegrown systems or use provincially mandated solutions, such as the Immunization Record Information System. The mix of teams at each station provided valuable, diverse perspectives.

The Café wrapped up with staff using clickers to participate in a group survey. The survey asked about staff learning,

While staff reported that the process mapping exercise was challenging, most said it caused them to view their program 'in a different light' and reflect on the complexity of a seemingly simple process. "It was great to see staff engaged and enjoying the Café," said Melissa McCann, program evaluator and committee member. "I even heard a few participants say they were reluctant to come given the topic and the idea of sitting in a focus group all morning, but left feeling positive about the process and knowledgeable about the Health Unit's plans."

The committee is now compiling staff feedback and incorporating it into an ECR strategy document for review by the Middlesex-London Board of Health. Like MLHU, many health units are trying to determine how best to move forward with ECR systems and improve documentation processes to support and enhance service delivery. The Café was a fun and simple process to engage staff and gain feedback on important elements of moving toward an ECR.

The committee did agree on one important improvement – in addition to the unstructured coffee and snack station, make sure everyone gets coffee as they arrive in the morning. The rotations meant that some had coffee first and some had it last – and it's never a good idea to come between a coffee drinker and their first cup on a Friday morning!

Ross Graham is the Manager of Special Projects and Rick Shantz is the Director of Information Technology at the Middlesex-London Health Unit in London, Ontario.



Ginette Blake, Petra Molnar and Laura Dueck map the client information workflow.

overall preparedness for an ECR and their enjoyment of the Café. The clickers were used for quick tabulation of survey results and for staff to see the extent to which their views meshed with the groups' views. Overall, staff felt very positive about the prospect of moving toward an ECR and about the Café process. In fact, 74 percent said their team was 'somewhat ready' or 'very ready' to move toward an ECR, another 23 percent said they already had a provincially mandated ECR system, and 97 percent were 'satisfied' or 'very satisfied' with the Café process.

North York General Hospital sets HIMSS Stage 7 certification in its sights

BY SONIA PAGLIAROLI

No hospital in Canada operates as a HIMSS Stage 7 medical facility, but North York General Hospital (NYGH) is committed to becoming the first. Clinical studies confirm hospitals that progress to the highest stage of HIMSS' Electronic Medical Record Adoption Model (EMRAM) have a higher percentage of improved patient outcomes, including more lives saved from life-threatening conditions.

As NYGH began executing its "eCare" initiative to automate patient care information systems, which resulted in a HIMSS Stage 6 certification in late 2010, an air of cautious optimism pervaded the halls. Two years after the successful implementation of computerized provider order entry (CPOE) and an advanced, closed-loop medication administration system, the atmosphere at NYGH is even more confident. Our front-line staff is reaping the benefits of a major overhaul of technology and clinician workflows particularly in the area of medication scanning.

NYGH is proud of its hard-earned HIMSS Stage 6 certification, however, as we work towards HIMSS Stage 7, there is still farther to go in our endeavor to further automate patient care information systems.

Making the leap to HIMSS Stage 7:

Any healthcare organization in the process of transitioning from a paper-based medical record to an electronic health record (EHR) understands that much more is involved than just deploying new technology and providing the requisite training. This major undertaking requires shifting the mindsets of a diverse, multidisciplinary staff so they are prepared to embrace a change that will impact their daily workflows. An important component of any successful, large-scale technology implementation is the presence of organizational leaders who are visible and vocal advocates of the project.

Before the system implementations began at NYGH, there was a lot of campaigning to introduce eCare to the entire hospital. Once the initial roll-outs began demonstrating the value of the technology, more and more staff members were

eager to bring automation to their units. We created a happy problem for ourselves and had to become agile in managing resources and timelines to keep pace with the new demand and excitement for technology.

As NYGH looks ahead to achieve



Sonia Pagliaroli

HIMSS Stage 7, we have started developing several new initiatives, including the deployment of advanced electronic medical record systems for emergency and operating rooms that will improve continuity of patient records throughout a patient's stay. The hospital has begun evaluating current operating room procedures to ensure all drugs administered pre- and post-op are documented online to eliminate errors due to fragmented records.

Using lessons learned to steer Stage 7 strategies: Although the lessons learned in obtaining HIMSS Stage 6 certification

remain fresh in mind, achieving Stage 7 requires a hospital to create a completely paperless environment in which data continuity is ensured and the exchange of clinical information occurs electronically. In the healthcare world, it's like scaling Mount Everest.

As NYGH discovered during earlier technology implementations, it is highly practical and useful to solicit the direct feedback and collaboration of clinicians who actually will be using the technology. Our frontline nurses were encouraged to acclimate to the Rubbermaid Medical Solutions medication cart chosen to facilitate barcode medication scanning before requesting cart accessories. Nurses learned firsthand which additional accessories would make the cart more efficient and contribute to a better clinical experience. The medication carts we use today have been so well assimilated into our clinicians' workflows that additional carts have been implemented in the hospital's pediatrics and critical care units.

A success story told in numbers: Hospital metrics show that technology

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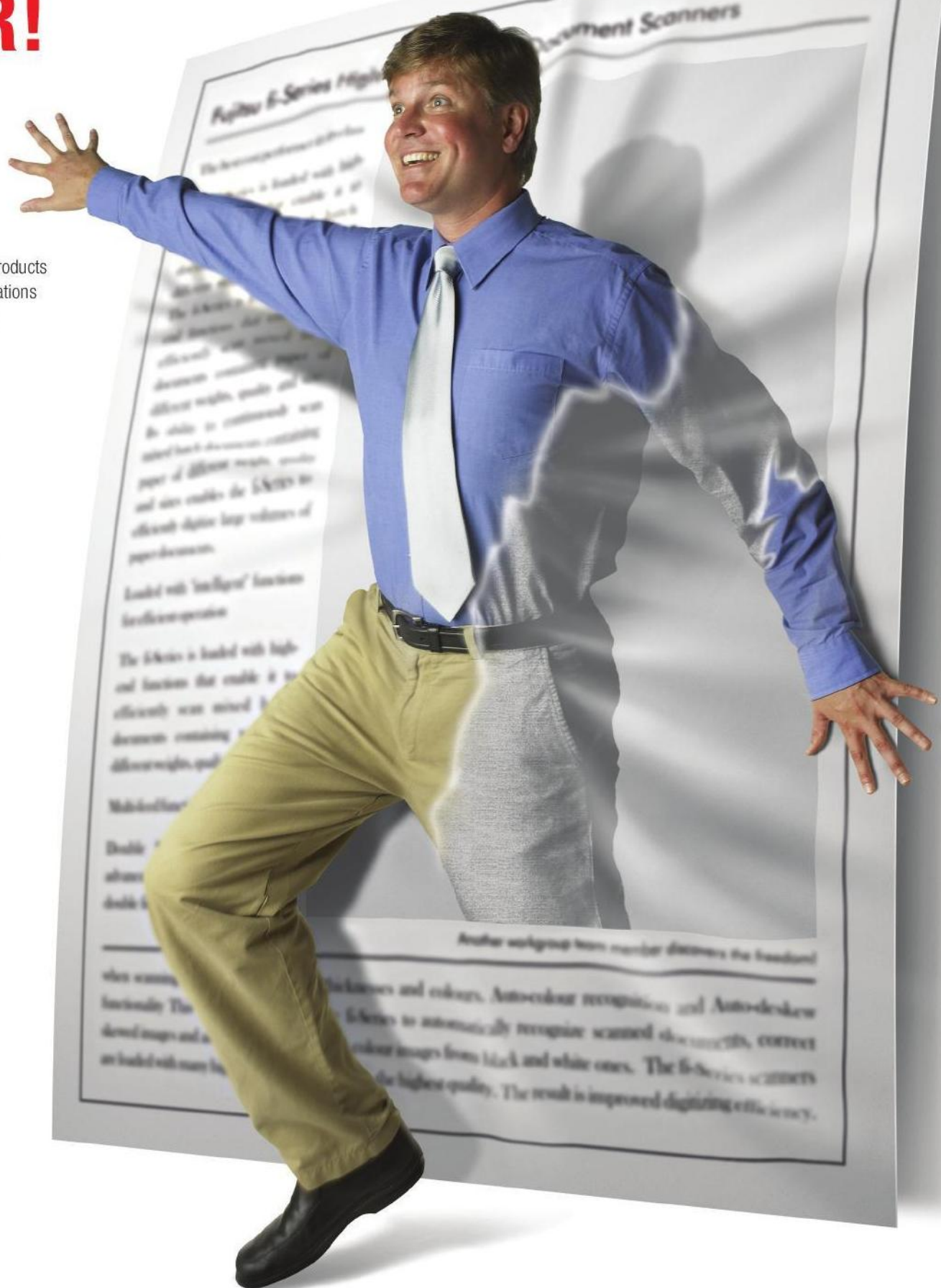
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Canadian champs named at the Royal College's Simulation Summit

BY NATALIE BRULÉ

OTTAWA – Visionary and practical discussions dominated the Royal College of Physicians and Surgeons of Canada's 2012 Simulation Summit, attended by more than 350 simulation centre directors, instructors, technicians, educators and others keen to learn more about medical simulation and its use for training health professionals.

Held at the new Ottawa Convention Centre in November, the 2012 summit was co-hosted by the University of Ottawa Skills and Simulation Centre and Algonquin College Health Sciences Simulation Centre. It included attendees from nursing, first response, surgical and medical disciplines, from within North America and elsewhere.

Against a backdrop of scholarship and key research in the field of simulation education, the event also featured the first SimWars competition in Canada.

SimWars entertains and educates: Created by Dr. Haru Okuda, Dr. Andy Godwin and Dr. Scott Wiengart, the SimWars competition had attendees on the edge of their seats as they watched teams respond to simulated clinical scenarios before being evaluated by a group of expert debriefers.

"You can teach communication, teamwork and clinical decision-making within a simulation environment," explained co-creator Dr. Okuda, who was on-hand to personally direct the program.

After two intense preliminary rounds that showcased the depth of talent of Canada's medical professionals, the Canadian Forces Resuscitation Team took the top prize, edging out the University of Ottawa Emergency Medicine team in the finale.

Breaking down silos and personalizing simulation: The 2012 Simulation Summit also showcased an impressive array of speakers working in medical education, simulation and technology.

• Agitator for change, Dr. Richard Reznick, dean of the Faculty of Health Sciences at Queen's University, opened the conference with his plenary that discussed the competing forces of increasingly long years of study and the need to graduate specialists when they are at their performance prime. Noting the efficiencies with which the aviation community trains their pilots, Dr. Reznick presented a case for better integrating competency-based training with real-world skills and job proficiency – without being tied to a set number of years of study. He added that simulation and other forms of assessment will play key roles in streamlining this process.

• Samsung Lampotang, PhD, a professor of Anesthesiology at the University of Florida, approached simulation from a technological perspective in his plenary.

Confidently declaring that the best simulator is the one you have with you for the "teachable moments," he projected that "we are very close to an era of personal simulators" and the question is not one of scarcity, but of accessibility. This dematerialization of simulation devices – keeping functionality while removing hardware – is only one among several current trends. Another is the increased merging of human simula-

trics at Oregon Health & Science University and the immediate past president of the Society for Simulation in Healthcare, gave a rundown of the different kinds of investors in medical simulation and what drivers may be more effective for the different groups. Dr. Seropian listed a variety of considerations including the value and return on investment. "Good investment requires thought," he explained. "Be deliberate. Know your investor."

Closing the conference, Dr. Fady Balaa, program director of the Ottawa Hospital's Division of General Surgery, shared his program's strategy to give residents "that touch and go Cessna experience" that aviator students receive with in-flight training. Dr. Balaa shared his team's efficient and low-cost strategy to acquire and repurpose animal organs for simulated training sessions that would have otherwise been disposed of in the regular food production process. He showcased this with a live onstage demonstration of a representative training session.

The 2013 Simulation Summit will be held in Vancouver, B.C., from November 8-9. E-mail simsummit@royalcollege.ca to be added to the mailing list and follow @RC_SimSummit on Twitter for up-to-date conference details and other medical simulation news.



Teams responded to simulated clinical scenarios and were then evaluated by experts.

tors, virtual simulation and physical simulation to create enhanced learning scenarios by way of augmented standard patients, mixed or hybrid simulation.

• Understanding your investor and giving trainees that "Cessna experience." On a more tangible level, Dr. Michael Seropian, a professor of anesthesiology and pedi-

Saskatchewan's DI repository serves entire province cost-effectively

BY SHELDON GORDON

Large diagnostic imaging repositories (DIRs) are being built in most Canadian jurisdictions. Designed to store and share the various types of images produced by hospital Diagnostic Imaging departments, the repositories will allow physicians across a region to gain quick access to previous images of patients.

In Saskatchewan, the entire province is covered using one centralized PACS and one diagnostic imaging repository. The provincial Crown corporation eHealth Saskatchewan launched the project in 2004-05, and has had its repository up and running since 2007 with technology from Philips Healthcare.

Saskatchewan's repository now connects 36 hospitals, has 3.4-million exams stored and is adding 55,500 additional exams a month. The images stored, and shared, include X-rays, ultrasounds, MRIs, CT scans, mammography, nuclear medicine, bone density, angiography and lithotripsy.

The repository has approximately 4,000 clinicians as users, including the majority of the radiologists, as well as other specialists and a large number of the province's GPs.

"The repository has meant an im-

provement for clinical care, especially in rural and remote locations of the province," says Susan Antosh, CEO of eHealth Saskatchewan.

The real advantage is that clinicians can view any exam at anytime from anywhere, says Antosh. "As long as you're an authorized user, you can view the image at any time, both in the hospital and outside through the web and Philips' iSite Enterprise. This helps with after-hours coverage, as one radiologist can cover much of the province."

Also, a specialist in, say, Alberta, can access an image for a Saskatchewan patient who has been referred to them. Two physicians – in different locations – can view the same image in real-time while discussing a particular case. "These are things that physicians were not able to do prior to the repository being in place," says Antosh.

A typical example is an injured patient, suspected of having broken a limb, who can be X-rayed at a rural site, have the X-ray read in Saskatoon and a cast put on where he is, negating the need for an ambulance ride to Saskatoon.

While Antosh hails the benefits, she doesn't downplay the work involved for the individual sites being linked. "We've used a 'See one, Do one, Teach one' kind of model, which has helped a lot in the regional implementations. If you're the

next region which is expected to implement, you visit a live site, observe it go live, and then the region that has just implemented would assist you at your go-live. There's a lot of cross-fertilization of ideas and peer-level support." (The province has 13 health authorities and the Saskatchewan Cancer Agency that store and access images.)

Antosh estimates the project's cost at about \$20-million spread over eight years. She declines to say how many vendors responded to the Crown corporation's RFP, but says Philips Healthcare was chosen because it "had the best combination of architecture, technical and presentation features. They also offered us a managed service: they manage the entire system for us. It wasn't a large capital cost at the front end, but a per exam cost." That approach makes costs manageable and predictable.

"It's a true North American show site for us," says Jeff Vachon, director, clinical informatics and software customer services for Philips Healthcare. "We're

showing the industry how easy and effective it can be to implement," either in a province (like Saskatchewan) where there is a single PACS, or in a province where there are multiple PACS vendors and interoperability is key.

He says the Saskatchewan DIR – the first full DIR that Philips has installed in Canada – is the only repository to have accomplished all of the requirements set by Canada Health Infoway and to have done so on time and on budget. "The repository has been very stable," says Antosh, noting that Philips has met its guarantee of 99.99 percent uptime on a monthly basis.

The system's special features include integration of OrthoView, which provides orthopedic templates for orthopedic surgeons to overlay over images; Primal, which masks the patient's images if requested for privacy; advanced 3-D visualization tools, and the capability to scan in paper-based documents, such as requisitions, into the PACS in the form of images.

Going forward, eHealth Saskatchewan intends to extend its network to the small health facilities that are not yet connected (and which account for about 20 percent of the public health images in the province). It also hopes to include the images from private radiology facilities.



Susan Antosh

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KONICA MINOLTA

Giving Shape to Ideas

Using telemedicine in Thunder Bay to create a parallel, virtual hospital

BY TRINA DINER
AND ANNE CRYDERMAN, RN

Telemedicine uses two-way video-conferencing systems and related diagnostic equipment to deliver patient care. Our goal was to imbed telemed-

icine technology into every clinical service offered at the Thunder Bay Regional Health Sciences Centre (TBRHSC), resulting in high quality, virtual, clinical experiences valued by both client and provider.

In 2007 the concept of a Parallel Virtual Hospital was launched at TBRHSC. This

375 bed regional facility is located on the north shore of Lake Superior in Ontario. TBRHSC is the major health service provider and referral centre for Northwestern Ontario, with a geographic catchment area over half a million square kilometers – a close comparator would be the country of

France. The population of the region is sparse (235,000 pop.) with 122,000 in and surrounding the city of Thunder Bay.

The remaining populations live in small communities scattered in the region. Many of these are First Nations, 24 of which are accessible only by air or winter ice road. The barriers to health, including geographic distance, weather and lack of local clinicians, offered a unique opportunity to deliver health services by telemedicine. Research indicated this would be best achieved by fully integrating telemedicine into clinical practice across disciplines and programs at TBRHSC.

The Northwest Local Health Integration Network (NWLHIN) is the agency



Trina Diner (at left) and Anne Cryderman.

that plans delivery of health services to the population within its jurisdiction, which includes the TBRHSC service area. The NWLHIN identified key objectives for the delivery of care in Northwestern Ontario:

- Access to care as close to home as possible
- Care delivery centered on patients' needs as they identify them
- Evidence informed practice
- Value for dollars invested

Mindful of the LHIN objectives we began the design phase of 'construction'.

We surveyed current and potential future users of telemedicine as well as physicians and managers within TBRHSC. We hosted workshops internally and regionally. We met individually with our most frequent users and began planning for the repatriation of telemedicine appointments from central studios to studios within individual programs.

We began integration where there were significant volumes attached to existing services. We encouraged internal new users to build programs tailored to their specific needs and provided central, continuing technical and program development support as new programs flourished.

We have made every effort to create a user friendly technical environment, so each program is empowered to use telemedicine as they would any other tool at their disposal to deliver care. For example, cardiac rehab services have videoconferencing equipment in their rehab gym. Patients attend from Thunder Bay in person while patients at two or three other rehab centers in different locations in the region are connected and participate simultaneously. In addition, physicians at our cancer centre see patients in person in the morning and provide care by video during the afternoon. Meanwhile, the bariatric services offer group intake and education sessions to patients spread across the region. Their team develops relationships with patients and their family supports regardless of location.

Health

Accelerating Change

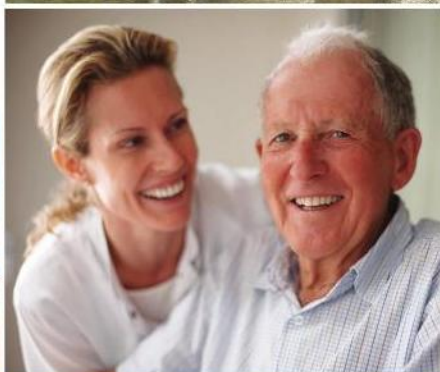
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Our most notable successes, measured five years after construction began, are the depth of penetration into existing programs, and the adoption of a virtual provider practice model. More than 100 providers and 35 clinical programs from within TBRHSC have embraced a virtual provider model.

Five years after 'sod turning', we refer back to the NWLHIN objectives to measure our progress.

Access to care closer to home: In 2006-07 prior to construction, 52 providers in 22 areas of specialty provided care to 3,078 patients in their home communities, using Telemedicine from TBRHSC. Five years later, in 2011-12, more than 100 providers in 35 specialties provided care to 7,886 patients in their home communities, using Telemedicine from TBRHSC. The growth in our programs continues at an average rate of 20-25 percent a year.

Care centered on patient's needs as they perceive them: Beyond obvious systemic successes, patient and family centred care is ultimately measured by our patients. Because we are a Patient and Family Centered Organization, the definition of quality is defined by the patient. To measure patient satisfaction we designed a survey tool focused on a number of our internal practice markers while encouraging patients to freely comment on the overall experience.

In its 2011-12 Annual Report, the Ontario Telemedicine Network published the results of a survey of a variety of patients from around the province about their telemedicine experience and their responses were very positive – 92 percent of patients using telemedicine indicated they were satisfied with their telemedicine visit and 91 percent would use it again.

We adopted some of the same indicators, and from January 2010 to December

2011, we offered surveys to 1,788 users of our telemedicine service:

- 1,293 patients (72.32%) completed these surveys
- 99.44 percent of patients using telemedicine indicated they were satisfied with their telemedicine visit and 99.35 percent would use it again. An additional 99.52 percent indicated they would recommend this service to family and friends.

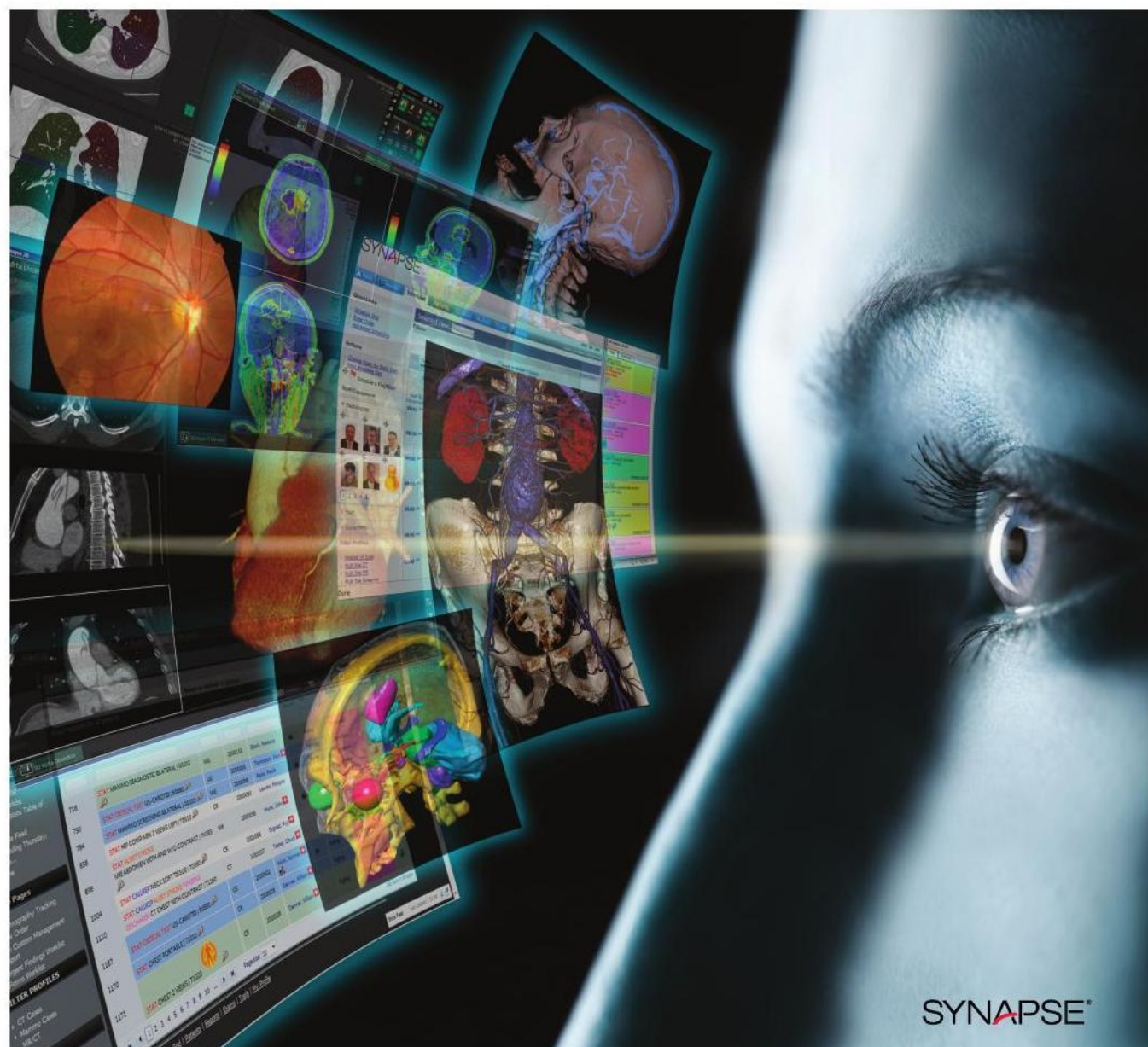
Practice informed by good evidence: TBRHSC has met the Canadian National Accreditation Standards for Telehealth (2011) and was awarded a leading practice designation for our tele-visitation program. We continue to survey our clients and respond to concerns voiced in order to improve service.

Value for dollars invested: The economic consequences of the use of telemed-

icine technology in the NW LHM are well documented. In the August 2012 NW LHM newsletter 'LINKages' the following observations were made. "In 2011/12, the use of telemedicine in the North West LHM resulted in more than \$21 million in avoided travel costs, and more than 50 million kilometres in avoided patient travel."

In addition to the hard cost of dollars

CONTINUED ON PAGE 22



New chief radiologist at Toronto's JDMI

TORONTO – Dr. Larry White was recently appointed Radiologist-in-Chief at the Joint Department of Medical Imaging in Toronto. Dr. White is the former site director of medical imaging at Mount Sinai Hospital and head of the Musculoskeletal Division within the JDMI. He earned his medical degree from the University of Toronto and began his professional career 17 years ago at Mount Sinai Hospital.

The Joint Department of Medical Imaging is the largest comprehensive medical imaging department in Canada. Its technology and highly trained staff are instrumental in the diagnosis, assessment, planning and treatment of patients at the UHN's Princess Margaret Hospital, Toronto General Hospital, Toronto Western and Toronto Rehab, as well as Mount Sinai and Women's College hospitals.

Dr. White notes: "The things that distinguish the JDMI are its people, its size and its profile on healthcare's landscape, provincially and nationally. These are things we sometimes take for granted, but are important aspects of what sets us apart from most other DI departments in the country."

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Healthcare analytics: Increasingly useful, but be aware of challenges

BY ANDY SHAW

Big Data, like Big Hair, need to be clean to be effective. And both require analysis to be fully understood. “Twenty years ago the fashion for these leading-edge conferences was all about healthcare re-engineering, but today they are definitely about data analytics,” said Richard Irving, PhD, in his welcoming remarks to the Data Analytics for Healthcare conference that was organized by the Strategy Institute in Toronto recently. Dr. Irving is an associate professor at York University’s Schulich School of Business, an expert in operations management and information systems, as well as a regular contributor to this magazine.

During the two-day conference, over 85 healthcare professionals of one stripe or another heard from 25 speakers ranging from keynote speaker Sten Ardel, director of the Health Analytics Branch at Ontario’s Ministry of Health, to the likes of Dr. Matthew Morgan, the vice president of Patient Experience and Outcomes at Toronto’s Mount Sinai Hospital, to analytics system vendors and authors of case studies.

But as conference chair Dr. Irving pointed out, there are few benefits, even inherent dangers, if those data aren’t first cleansed.

“When you are dealing with data sets, large or small, the data are never, ever clean. They need to be cleaned. And so the question is: How do you do that? How do you make sure that the data are all in some format? How do you make sure they aren’t missing pieces of information or that some of them aren’t erroneous? Well, the answer is: someone has to go through those data sets and painstakingly make them all uniform.”

To illustrate the data clean-up’s scale, Irving told the story of a colleague in charge of a large analytics group at the National University of Singapore.

“We couldn’t do it here because of our privacy (laws), but he had telecommunications data from every cell phone in Singapore, which gave his study group about 18 million data points. And even though the information was collected automatically by a technically sound system, just to clean the data and make it consistently accurate still took them over four months.”

The next big data challenge, as Irving sees it, is that once dissected and cleaned: How do you then analyze the data?

“I am not suggesting you have to be an expert in statistics, but you do have to be aware of the data’s context. You have to know the answers to: How was the information collected? And once collected, how were the data modelled? So, if you get unmodelled, context-free reports, I don’t care how sophisticated the reports are, you need to be very wary of drawing any conclusions from them.”

In what might one day be a text book example of being cautious about context, Dr. Carolyn Armstrong, now the Canada Research Chair in Health Informatics at the University of Ontario Institute of Technology (UOIT) in Oshawa, talked about intensive care babies in her Australian homeland.

“A lot of what you have heard at this conference already is about how analytics can help better healthcare administration, but what I’ve been most interested in is how it can improve care at the bedside,” said Dr. McGregor. “As part of my doctoral research back home, we looked at very pre-

mature babies who were being monitored closely to watch for trouble using many different markers and whose vital signs were producing a number of physiological data streams. One of those is heart rate, and if you are looking for infection in those premie babies, you really should be

looking at every single beat of the heart.”

However, nurses traditionally were taking a heart rate reading only once an hour. So in that context, if every hour the baby’s heart rate is about the same, the nurse and others reading the chart would likely conclude that the child’s condition is stable.



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"However, in that hour between readings, the baby's heart can beat around 7,200 times. So, 7,199 beats of the heart are not represented. Similarly, a baby can breathe over 2,100 times in an hour, so 2,099 breaths and corresponding oxygen levels are lost," said McGregor. "And a lot can happen in that hour to the baby that won't be seen."

But such is the state of big data gather-

ing systems these days that a research team could capture a reading for every one of those beats and breaths. "We calculated that there are 90 million data points being generated per day, per baby, that we can analyze to get a much better picture of what is actually happening."

Dr. McGregor has carried that know-how to Canada and is directing a collaboration of UOIT, the Sick Children's Hospital in

Toronto and IBM Canada to bring real time big data analytics to young kids' bedsides.

Nor are the more mature being neglected by data analytics. Just ask Jennifer Close. She is the engaging vice president of operations at the Dean Clinic in Middleton, Wisconsin.

"We used analytics to get comfortable with change," said Close just before lunch on the conference's first day while speak-

ing on her case study topic of: "From Volume to Value: Transforming Care Delivery to Improve Quality, Patient Experience and Efficiency".

The Dean Clinic is one of the largest integrated healthcare systems in the U.S. midwest, with 800 staff in a multi-specialty physician group practice serving 300,000 patients at over 60 sites.

"We are owned by 370 doctors who are our shareholders and, of course, we are in the healthcare business to make money," admitted Close. "But very much to their credit, our owners took a risk and decided to shift away from focusing solely on the money-making that volumes of patients bring and toward greater value provided to the patient. Now our paradigm is an equilateral triangle of volume, quality of care, and organizational efficiency – and analytics is helping us get there."

For example, on the value side of the triangle, analytics of its electronic medical records proved to Dean that its hypertension patients were not special people with special blood pressures.

"It was amazing when we looked at the data. We seemed to be the only healthcare facility in the world with patients whose blood pressure readings always ended in a zero," said Close. "So we investigated and found that, for whatever reason, our nursing staff was rounding off the blood pressure readings either up or down so that they all ended with a zero. We also found out that a number of our BP readings done with regular blood pressure cuffs were being recorded in EMR fields that could not be queried. So, often second blood pressure readings being taken to confirm an abnor-

When you are dealing with data sets, large or small, the data are never, ever, clean, commented
York University's Richard Irving.

mally high first reading were not in the system. Consequently, the system would not trigger a best practice alert and a dangerous second reading would go unnoticed."

Thanks to the analytics that led to finding these deficiencies, Dean undertook a "Rapid Improvement Initiative" resulting in a clinic-wide shift to digital cuffs and a fail-safe on its EMR that prevents any electronic chart from being closed – if a second BP reading is not recorded after an initial high reading.

It's those high readings that also speak of another challenge in putting data analytics to full work in healthcare. In the classic scenario, a nefarious insurance company manages to dig the high blood pressure numbers from the EMR of a patient seeking life insurance. Bingo, up goes the premium or insurance is denied. For many, privacy is the 800-pound gorilla in the data analytics cage.

In her second-day presentation, Manuela DiRe from Ontario's Office of the Information and Privacy Commissioner began with some numbers of just how big Big Data has become and hence how potentially very leaky they are.

"We humans every day create 2.5 quintillion bytes of data. And if you want to know just how big a quintillion is, just add 18 zeros," said DiRe who as a lawyer is the

CONTINUED ON PAGE 20

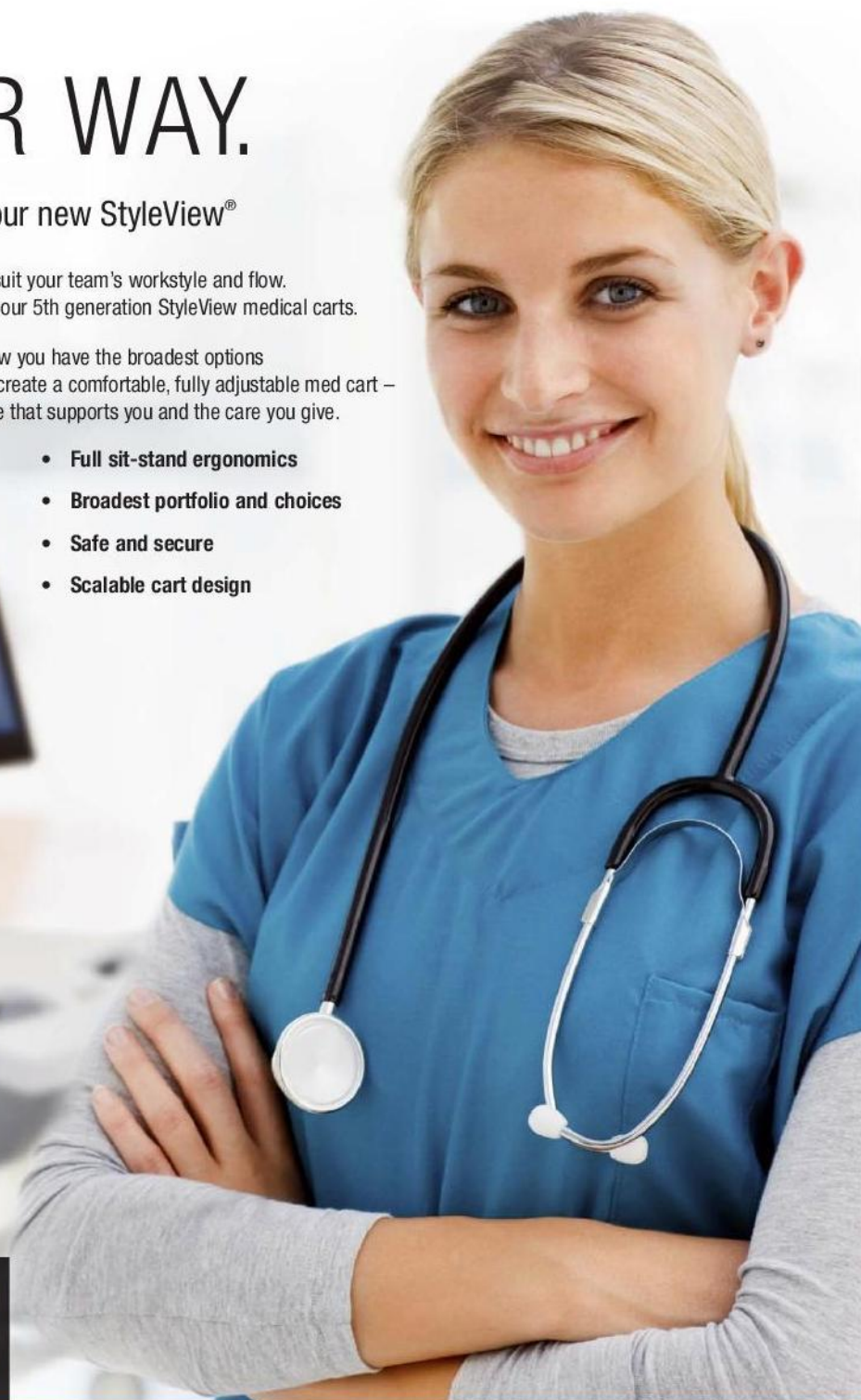
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Organizations must constantly remind staff about snooping dangers

BY DIANNE DANIEL

Is patient privacy more than a legal or ethical obligation? Can patient confidence in a healthcare provider's ability to protect sensitive medical information influence the course of care delivery? The answer to both questions is yes, says Kurt Long, founder and CEO of Clearwater, Fla.-based FairWarning Inc.

"As electronic health records, telemedicine and other forms of digital healthcare have become more popular ... this idea of trust between the patient and care provider is more important than ever before," says Long. "Privacy is actually an

To gain patient confidence, healthcare providers must be upfront about their privacy activities, including breaches.

important part of enablement; it actually enables patients to receive the best care possible."

Founded in 2005, FairWarning provides patient privacy monitoring solutions to thousands of customers in seven countries and 45 American states. In 2011, the company set out to learn more about the role of privacy and how privacy considerations impact healthcare delivery by conducting a series of surveys.

Here in Canada, more than 40 percent of patients surveyed on behalf of FairWarning stated they would withhold information from their care provider if they had a sensitive medical condition. Slightly

more than one-third reported that they would be willing to travel a substantial distance to avoid being treated in a hospital they did not trust. And just under one-third said they would postpone seeking care due to privacy concerns.

At the same time, an overwhelming 98 percent of Canadian patients believe healthcare executives have a legal and ethical responsibility to protect medical records, and more than 75 percent also state that those executives should be doing more to stop unauthorized access.

What it all adds up to is that ensuring patient privacy is no longer a "should do" or "need to do" but is now viewed as an "asset," notes Long. "Care providers – the enlightened ones – are beginning to think of this as, 'Hey! I want to be out there saying we're a leader in privacy and security. I would like posters in my lobby and maybe brochures for patients so my patients – starting with my own employees – have the confidence to come to me,'" he says.

In order to gain patient confidence, healthcare providers need to be upfront about their privacy activities, including the disclosure of breaches when they occur, and appropriate sanctions for those involved. "You have to be willing to take action regardless as to whether the registration desk employee did something wrong or one of your top physicians," notes Long.

At a high level, FairWarning recommends three steps towards guarding against breaches by employees: insist that all software vendors provide access to the audit logs produced by their applications; identify vulnerabilities and put written

policies in place to ensure employees are aware of them; and, implement appropriate monitoring technology to dovetail with those written policies.

After highly publicized information

When fully implemented, the cost will be around \$200,000.

In a statement provided to Canadian Healthcare Technology, Eastern Health reported that it is using the Security Audit Manager (SAM) from Iatric Systems of Boxford, Mass., to perform real-time system monitoring in the background as a means to identify potential privacy breaches. The health authority also conducts random manual audits – approximately 500 per month – to monitor employees' access and use of personal health information. As of September 2011, new employees take an oath (affirmation) of confidentiality and existing employees who signed a confidentiality pledge previously are being asked to reaffirm that commitment to privacy with the oath.

Breaches by staff are a common phenomenon addressed by FairWarning, says Long, but it takes more than the implementation of software monitoring tools to curb them.

Studies conducted by the company indicate that when hospital employees are advised of a monitoring software implementation, like FairWarning or SAM, a 50 percent decline in

the number of potential incidents is typical. Without ongoing education and follow-up, however, the number starts to climb again.

"It doesn't have to be a public execution but there has to be sanctioning and then word travels that, 'Okay. They're actually following up.' And then from that point forward we'll see a decline," says Long.

Health Information Technology Services – Nova Scotia (HITS-NS), the group responsible for managing a centrally hosted health IT network across Nova Scotia, has used FairWarning since 2009. Applying advanced user data, HITS-NS uses the monitoring software to detect co-worker snooping, supervisor snooping and other customizable analytics. "Employees know that violators will be held accountable and this has had a dramatic impact on patient privacy," states a related case study.

As part of its privacy and confidentiality practice, Eastern Health facilitates privacy education and awareness activities to encourage discussion among employees and routinely sends notices to staff outlining the privacy practices in place. It also sends regular reminders notifying staff about their accountability.

When a deliberate breach takes place, as it did last summer, Eastern Health takes action to discipline the offending employee, which may include suspension or termination of employment.

"In the past, some have thought of the healthcare industry as completely virtuous ... that somehow it's magical and these guys all do the right thing," says Long. "The reality is that unless there's some kind of package of enforcement, notification, disclosure, and maybe even fines, privacy falls pretty far down the list."



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Encryption by default must be a top priority for healthcare providers

BY DR. ANN CAVOUKIAN

One of the single greatest challenges in healthcare is the proliferation of portable, end-point devices and mobile storage media, which are lost, stolen or compromised in staggering numbers. The loss or theft of unencrypted mobile computing devices or storage media remains the number one cause of healthcare breaches in the United States, where they account for 53 percent of all reported breaches since 2009.

As portable storage devices become more prevalent in the healthcare sector, so do concerns regarding the privacy and security of personal health information (PHI). As Ontario's Information and Privacy Commissioner, I have had to investigate a number of unfortunate cases of lost PHI in the healthcare sector which could have been avoided by implementing proactive and preventive measures.

Medical professionals in high-availability data environments, from family doctors to large hospitals, need to ensure data security and protect health information, as the potential for privacy breaches can be both costly and cause lasting damage to an organization's reputation.

The clear solution is encryption by default. The long-term benefits cannot be

over-estimated – we know that the default rules!

Taking these steps provides a doubly enabling positive-sum outcome, which benefits both patients and caregivers. While encryption of end-point devices is not new, the need for seamless access



Dr Ann Cavoukian

in high-availability environments means that deployment and support considerations are now major factors when considering solutions.

Regardless of how these technologies are deployed in operation, taking a Privacy by Design approach by mandating encryption by default goes a long way towards meeting the challenges of securing an organization's expanding perimeters, as well as achieving compliance and trust objectives.

To help outline a model example to healthcare providers, I recently introduced the "Circles of Trust" concept in a new paper in partnership with Toronto's Sunnybrook Health Sciences Centre and CryptoMill Technologies. The concept refers to the mobile encryption deployment scenarios and role-based access that enables the free flow of PHI among authorized healthcare providers as needed, while at the same time, ensuring that PHI remains encrypted and inaccessible to everyone else.

These challenges can be successfully met through the use of appropriate policies and innovative technological tools that are designed to ensure sensitive data is automatically encrypted by default. At the same time, they ensure that the encryption process does not prevent the authorized use of health information by those who enter and exit from a "Circle of Trust".

Encrypting numerous portable devices is not always easy to accomplish in such a large and dynamic operating environment.

However, Sunnybrook has shown its leadership in privacy and security practices by understanding the message that healthcare can benefit from improvements in se-

curity technologies and access to information without significant user or institutional burden.

For a deeper discussion of the challenges and opportunities for assuring PHI security beyond the current state of adoption, I invite you to download the full pa-

per, Encryption by Default and Circles of Trust: Strategies to Secure Personal Information in High-Availability Environments, from www.ipc.on.ca.

Dr. Ann Cavoukian is Ontario's Information and Privacy Commissioner.



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How do we create the right conditions to grow healthcare IT?

Building an integrated healthcare system in large jurisdictions is complex and difficult.

BY RICHARD IRVING, PHD

Imagine a jigsaw puzzle with a million pieces, a thousand shapes and a hundred colors. Let's also assume that you don't have a clear picture to work from, only a blurry image. Go ahead and construct the puzzle. Now you begin to get an idea of the complexity and difficulty of building an integrated healthcare system in Ontario and most parts of Canada.

One thing seems clear. Large projects don't work, as illustrated by recent e-health failures in several provinces. As an alternative I suggest some steps that can help us assemble the e-health puzzle more effectively.

- Focus on small, easily managed projects where the benefits are clear. By small, I mean less than \$1 million and less than one year in duration if they are IT projects or process redesign projects.

- Establish firm constraints on data standards to guide the development of these projects. These include standards for data transfer, database design, and security. Standards must be set with the active participation of all stakeholders in the healthcare system. Where clear standards are either not in place or where there is debate as to which standards are appropriate; establish pilot projects. The results from these projects will contribute to the process whereby sensible standards can emerge.

- Clearly define behaviors that are necessary and change funding formulas to reward appropriate behavior. This includes both clinical and administrative behavior. Appropriate behaviors must be defined where possible by consultations with front-line healthcare workers, as well as with senior bureaucrats and administrators. It would be nice to include clients of the healthcare system, too.

- Provide targeted funds to support process redesign and system renewal. Each project must have clear and measurable objectives and be responsibly monitored. Failures should be treated as opportunities from which to learn and not as disasters to be hidden.

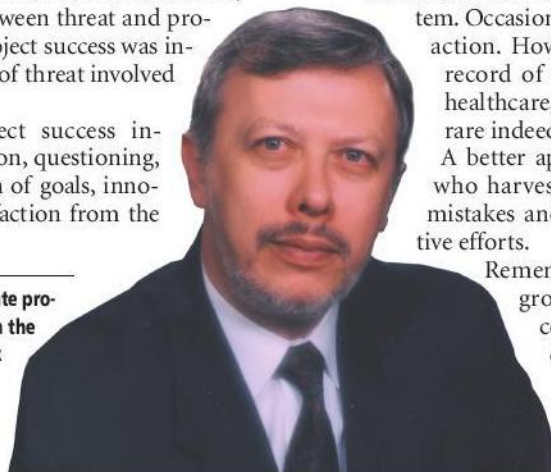
In the words of Thomas Edison: "Genius! Nothing! Sticking to it is the genius! Any bright-minded fellow

Failures should be treated as opportunities from which to learn and not as disasters to be hidden. There should be no fear of missing the mark.

can accomplish as much if he will stick like hell and remember that nothing good works by itself. You have got to make the damn thing work! ... I failed my way to success." To follow this theme a bit further, a study of the relation between threat and project success found that project success was inversely related to the level of threat involved in project management.

They found that project success increased with free expression, questioning, participation in definition of goals, innovation and intrinsic satisfaction from the work itself.

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.



- Give it some time. A complex infrastructure is not built overnight. And, until most of the components are in place, there is little to show for the time and effort. The principle here is based on Metcalfe's Law (often known as network effects), which states that the value of a product or service increases as its number of users expands. Specifically, the value of a network is equal to its number of users squared.

At the same time, a fragmented provincial or national healthcare system, where only bits and pieces are integrated, is of limited use. But when a sufficient number of users are part of a connected network, the network's value skyrockets.

As a patient of the Ontario healthcare sector and a client of these fragmented systems, I see only one healthcare system which I expect will serve my needs. Consequently, government has a strong leadership role in coordinating these efforts; harvesting good ideas and providing incentives for behaviors that will move us toward an integrated healthcare system. Occasionally it may have to mandate action. However, given the poor track record of top-down management in healthcare, these occasions should be rare indeed.

A better approach is that of a farmer who harvests good ideas, learns from mistakes and who encourages productive efforts.

Remember, no farmer has ever grown crops. A farmer creates conditions under which crops grow themselves. If you have comments or thoughts on this column you can reach me at rirving@schulich.yorku.ca.

ON FURTHER REFLECTION

I see a different IS department in your future

BY DOMINIC COVVEY

It's the New Year and this is the scheduled slot for futurists and their predictions. Well, I am definitely not a qualified futurist – I must have slept through that class. But there are some futures in the eHealth domain that even a vision-impaired person like I am can see clearly.

I have been thinking a lot about the future of Information Services Departments (ISDs) in our hospitals. What will they look like in 5 to 10 years? What should they do, how will they be populated, and how should we begin the transition to new roles.

Information Services will recognize that a model like the 'Consolidated Lab' is the likely future. The Consolidated Lab concept, which

has been adopted by many leadership organizations, involves local services where rapid turnaround is required, but sending all other testing to central labs.

So, immediate needs are addressed immediately, but tests whose results aren't needed right away or can't be produced quickly are consolidated in a facility that receives volume from many hospitals, has enough volume to justify robotics and whose instruments can be run 24 hours a day, every day.

To see the relevance of this model, we need to look at what the ISD of the future must deliver. Consider these thoughts:

- I don't think it's a secret that the ISD of the past was essentially a computer-oriented organization. It acquired, installed, implemented (and did training) and maintained

hardware (including networks and facilities) and software. A few ISDs also did a smattering of development. The ISD we have come to need must deliver very different services. For example, the ISD must



H. Dominic Covvey

deliver departments and enterprises. In other words, there is a need for the ISD to look at the holistic picture where technology will be a new infrastructural element. Sure, the ISD would do all that stuff with systems. But it must also do things like: understand what the target user department needs to

become and the services it needs to provide; deal with organizational and human resources restructuring; manage change; educate and train staff; re-engineer work processes; and finesse things like adoption and proficient (let alone meaningful) use. That's a vastly different set of services compared to those delivered by the classic ISD! Realize to that 'The Cloud' has produced a wholly new opportunity for how computing is provided. It's possible to imagine a hospital with no computer facility ... not even in the same city or country or even one location anywhere!

- Of course, to deal with these new challenges, we need to populate the ISD with a different mix of people. Sure, we still need some computer, software and network specialists. But the proportion of these will

Using big data and collaboration to tackle big healthcare challenges

BY SHANNON O'CONNOR

In the era of 'big data' analytics, the best opportunity to solve some of the healthcare industry's greatest challenges comes from collaboration between academia, industry and government.

That's why the new IBM Canada Research and Development Centre (CRDC) offers Canadian researchers an unprecedented opportunity to solve some of the world's biggest challenges – by giving them access to an advanced high performance infrastructure that includes the most powerful supercomputer in Canada and some of the most advanced analytics software available today. The timing couldn't be better.

Researchers at McMaster University, Queen's University, University of Ontario

Using high-powered computers and software, healthcare researchers can tackle problems that involve huge data sets.

Institute of Technology, University of Ottawa, University of Toronto, University of Waterloo, and Western University are about to take on some of the greatest challenges humankind has ever faced in areas including healthcare, energy use, aging urban infrastructure and water conservation.

IBM's \$175 million investment in the \$210 million initiative recognizes the power of combining the talent of academic researchers with high performance computing infrastructure. The CRDC is a public/private collaboration that includes IBM, the governments of Canada and Ontario, and the consortium of seven univer-

sities, led by University of Toronto and Western University.

Let's take a closer look at the four healthcare projects underway at the CRDC.

Online health analytics through cloud computing for improved critical care: Led by Dr. Carolyn McGregor, Canada research chair in health informatics, University of Ontario Institute of Technology. Critical care units are one of the most costly areas within hospitals, accounting for about 16 percent of inpatient direct expenses but only 8 percent of inpatient days. Due to Canada's geography, many critically ill patients in rural and remote communities have minimal access to critical care services.

McGregor's research proposes to establish an accessible cloud computing infrastructure for critical care online health informatics. The Artemis Project will use real-time analytics to analyze massive streams of physiological data from patients in remote areas to detect life-threatening conditions before they are apparent to the clinician. This builds on her ongoing work analyzing data generated from premature infants in a neonatal intensive care setting, which was first implemented at The Hospital for Sick Children in Toronto in August 2009.

"Our research is demonstrating that greater support is possible for patients within Critical Care Units in rural and remote centres, without the immediate need to transfer the patient to an urban centre," McGregor says. "We can't make sense of the massive amounts of data we collect without the supercomputing and analytics power IBM is providing."

Certification of safety and security in software-intensive medical devices: Led by Dr. Alan Wassyng, associate professor, Department of Computing and Software, McMaster University and director, McMaster Centre for Software Certification.

Thousands of deaths involving infusion pumps are reported in North America every year. As with most medical devices and health information systems, concerns related to safety and reliability are of paramount importance. With insulin infusion pumps now programmable through wireless connections, a major security risk exists.

Wassyng's team is focused on developing methods for building safety and security into the software of insulin pumps. The team is working in collaboration with the FDA to identify and predict the ways in which an insulin pump may overdose or underdose a user, and then mitigating those risks to ensure the safety and dependability of this safety critical medical device. Eventually, the research team plans to create a template and prototype for the development of safe, secure, reliable insulin pumps, together with a certification process for evaluating such pumps.

Privacy and security in personal health information: Led by Dr. Stan Matwin, distinguished university professor, EECS, University of Ottawa. A multi-disciplinary University of Ottawa team (Computer Science, Management and Medicine) is working to develop new methods for private and secure handling of personal health information in a cloud environment. While effective security methods exist, they focus mainly on protecting the two-party data exchanges from intrusion of third parties.

The University of Ottawa's project will examine how to facilitate information flow between different players in the healthcare ecosystem. Health informa-

tion must flow seamlessly across health professionals, providers and researchers. However, existing legal and regulatory frameworks impose constraints on how information can be shared, and emphasize data privacy as a patient right. Matwin's goal is to develop and prototype a mechanism for sharing information while respecting privacy of the patient, so that effectiveness of treatment is enhanced and facilitated.

Real-time graph dynamics from scanning measurements: Led by Dr. Mark Daley, associate professor, Department of Computer Science and Biology; principal investigator, Brain and Mind Institute, Western University. Millions of people in Canada are affected by neurological disorders. Daley's research brings together scientists from neuroimaging, neuroscience and high-performance computing.

By studying dynamic networks in real-time, faster, more accurate diagnoses, better outcomes, and optimal use of expensive scanner time can be achieved. Dynamically adapted brain scanning allows the test to be stopped, tuned and adjusted while it is under way. Neural functional connectivity networks have been shown to be diagnostic indicators for several brain disorders, including autism, schizophrenia, Alzheimer's, and ADHD.

"The tools IBM is providing allow us to take these colossal data sets and make sense of them in an automated way," Daley notes. "In neuroscience, we generate terabytes of data from images of oxygenated blood flowing into the brain. The new computational resources will allow us to automate that analysis so we can boil that down into simple models."

Shannon O'Connor is Director, IBM Canada Research and Development Centre.



Shannon O'Connor

drop radically relative to the new competencies required. The ISD will need folks with real organizational and human resources management backgrounds. There will also need to be professionals with capabilities in process engineering, education and training, management of change and the like. Note the word 'professionals', which connotes a big step past amateurs with textbooks or wanna-be's. Perhaps these needs will be addressed by collaboration of the ISD with other departments – but this can't be informal or ad hoc. Maybe the answer will be to grow the ISD, and there may be examples of each or hybrids. Whatever the response, it must make the ISD (perhaps with its collaborating organizations) an entity capable of delivering functional, efficient and productive macro-level entities like departments, not just eStuff.

• Given the need to have a competent complement with such a wide range of expertise, it is highly unlikely that every hospital or major clinic will have its own

ISD. This is where the consolidated lab model comes in. It would make sense that key hard to get and retain expertise would be shared from a central organization. It would also be likely that some personnel, who had to deal with immediate issues, would be based at each institution. Frankly, I also expect that a number of classic ISD functions would be outsourced to the private sector –

The IS department will need folks with organizational and HR skills, along with engineers, educators and trainers.

things like workstation installs and updating, ever-greening, office productivity software installation and maintenance and other tasks that are the same for every organization. This would allow ISD staff to focus on health-specific IT and those other essential services. Quite a few examples of these shared ap-

proaches already exist: organizations like SIMS in Toronto, the precocious child of Matt Anderson and his team, and the provincial group in Alberta that deals with workflow and many of the other areas mentioned above.

Assuming you accept at least my main assertions, then maybe you'd agree that the term 'ISD' will become obsolete, because the services go far beyond 'Information Services'. But, what would be a better term? What about 'Organizational Innovation Services' or 'Infrastructural Services'. The latter one at least allows the retention of the 'IS'. I guess you might say that it's just a name, so who cares. Well, a name should convey a message that is the one we want to communicate. That's why we call a person a 'judge', a 'doctor' or a 'nurse'. So, maybe that's something to think about and maybe we should have a 'Name the Baby' contest.

What needs to be clear, though, is that the challenges the ISD faced in the past are changing, and changing radi-

cally. The ISD needs to move beyond technology and techies. The ISD-properly-renamed must start to see itself as supporter and enhancer of 'businesses', like Diagnostic Imaging, the Clinical Lab and the back office. To do this, the Future-ISD needs to understand the new challenges it faces and will face, to reconceptualize itself as a 'Total Services' organization – many vendors have already done this and may provide models for consideration.

They must also acquire the appropriate expertise – full-time, part-time, seconded, or shared – and develop a track record, credibility, acceptance and probably a different funding model that fits its new role.

I can imagine that there are many creative responses to the challenge of evolving the ISD. Please bring them forward so we all can learn from you.

But, whatever we do, we cannot rest on our laurels, because clearly the world and its needs have changed. And one doesn't need a crystal ball to see that!

Radiologists search for ways to put patient, not image, at the centre of care

New technologies are appearing that improve the patient's experience in DI departments and clinics.

BY JERRY ZEIDENBERG

CHICAGO — At the most recent Radiological Society of North America conference, held in November, the talk was of putting 'Patients First'. In fact, that was the theme of the conference, but it could be a difficult change of mindset when physicians are used to being put on pedestals in hospitals and worshiped as demi-gods.

For radiologists, it means moving out of the reading rooms and getting back in touch with patients — of humanizing the relationship with the sick. Not only are patients asking for respect and better care, but in the United States, Medicare reimbursement rates will be tied to patient satisfaction starting this year.

In Canada, patient satisfaction — or dissatisfaction — is a quick measure of the overall quality and efficiency of hospitals and clinics. When large numbers of patients are griping, it's a pretty clear indication that things are not working as they should.

To address issues of quality and patient satisfaction, forward-looking radiology departments and companies are busy developing solutions. A major step forward is the rise of image-enabled Personal Health Records, which essentially offer patients quick access to their own diagnostic images and reports.

The idea is to make it easier for patients to share pictures and reports with their many care-givers. Too often, patients are asked to retrieve their images on CDs at hospitals, a task that eats up hours of their time, not to mention the money needed for the hospital parking lot. Even after obtaining the CDs, the disks can be lost and new ones are soon needed for the next hospital visit.

For its part, Carestream Health, based in Rochester, N.Y., announced MyVue, a cloud-based solution for radiology departments that enables patients to access exam images, anytime, anywhere.

The company recently offered MyVue to 3,000 patients at Houston Medical Imaging, a chain of three out-patient imaging centres in Houston, Tex., and 1,500 of them signed up. Patients were able to download images and reports and forward them to their physicians, saving them a lot of time and trouble.

"They found it easy to use," said Bob Hamilton, general manager of Carestream Health Canada. "Out of the 1,500 patients, there were only 47 calls to the IT department," most of which were for password resets and not because of difficulties with the portal. Hamilton noted the actual cost of making CDs for patients at hospitals and hospitals can run to \$60,000 to \$70,000 a year, when you factor in staff time for duplicating the disks, the equipment and the couriers that are sometimes used to send them.

That money can be saved by allowing patients to access their own images. Hamilton said the solution would make a good deal of sense for Canadian hospitals, which also spend time and money on making CDs for patients.

What's more, if physicians can't readily access previous exams, they often order new ones; it's estimated that up to 30 percent of radiological exams are medically unnecessary. If patients can quickly obtain previous exam images for their doctors, repeat exams would likely be reduced, and the savings to the system could be significant.

To this end, the RSNA itself launched its own Image Share network in 2011, which enables patients to

access their diagnostic images at five participating hospitals. This year, the RSNA announced it has received \$5.3 million over two years to expand the system. The money comes from the National Institute of Biomedical Imaging and Bioengineering and there is an optional \$5.5 million for an additional two years.

According to the RSNA, there is interest from 20 more hospitals to join the network. The idea behind the project is to make it much easier for patients to share their medical images with caregivers. This should reduce the number of redundant exams that are ordered by physicians, which will in turn reduce health costs and X-ray exposure to patients.

The Image Share network currently includes five sites: Mayo Clinic in Rochester, Minn., the Mount Sinai

Radiologists and other physicians may come to see image sharing with patients as a way of improving their own workflow.

Medical Center in New York, the University of California — San Francisco, University of Chicago Medical Center, and University of Maryland Medical Center in Baltimore. The network has been used by more than 2,000 patients since it began operation in 2011.

Expect to see more PHR solutions of this type as patients push for more control of their records, and

radiologists and hospital managers see image-sharing with patients as something that actually improves their workflow. In Canada, the solution may also obtain the blessing of provincial governments, who foot the bills for unnecessary exams.

What were other highlights of RSNA 2012? Here are some of them:

Ultrasound: Siemens Healthcare showed its wireless ultrasound system, called the Acuson Freestyle. There is no cable joining the transducer and the workstation — which is a world-first, according to Siemens. "It's a monumental task to get rid of the cable," commented Joe Urbano, a Siemens ultrasound developer and a member of the team that devised the Freestyle. "The front end has been shrunk and encapsulated in the probe."

It took six-and-a-half years to produce the innovation, which involves breakthroughs in acoustics, batteries, radio design, miniaturization and image processing. One of the biggest challenges was in producing a wireless probe with enough computer processing power, but which requires relatively little energy and doesn't drain the battery. "It uses less than four watts," said Urbano.

The system is being aimed at interventional and operating room procedures, where ultrasound is extremely useful but cables dangling from the transducer heads are cumbersome and a source of potential infection. Immediate applications are for line placements, drainage procedures, cysts and nerve blocks.

Urbano noted the system is currently being tested at more than 20 beta sites. It will be offered commer-



GE Healthcare announced the acquisition of an ultrasound technology that uses 3D imaging to detect cancer in dense breasts.

cially in the near future, and additional types of transducer heads will be developed. "This will be a whole platform," he commented. Currently, three wireless transducers are available, with applications for general imaging, vascular and musculoskeletal and nerve imaging.

For its part, GE Healthcare had its own ultrasound news to announce at the RSNA meeting. The company in November 2012 acquired U-Systems Inc., of Sunnyvale, Calif., which has produced a flat-panel, 3D ultrasound technology capable of detecting cancers – quickly and without physical discomfort – in women with dense breasts. The system, called the somo• v Automated Breast Ultrasound (ABUS) has been approved in the U.S. as an adjunct to mammography, and is also available in Canada.

According to a study in the New England Journal of Medicine, women with dense tissue in 75 percent or more of the breast have a risk of breast cancer four to six times as great as women with little or no dense tissue. Since dense breast tissue decreases mammography's effectiveness in detection, the somo• v ABUS has proven to be a tremendous advancement in the visualization of cancer-hiding tissue in dense breasts.

Recent studies showed the somo• v ABUS found 30 percent more cancers in women who have had a normal mammogram, normal physical examination and dense breasts.

The somo• v ABUS can conduct the exam in 10 minutes for both breasts, compared with the 45 minutes required using traditional ultrasound. What's more, the system is automated, meaning it is operator independent and doesn't require a highly skilled technologist.

While MRI is still the gold standard for breast cancer detection, MRI is much more expensive than ultrasound and requires much more time for an exam. In Canada, the somo• v ABUS is available for about \$250,000.

X-ray dose: In recent years, the need to reduce the X-ray doses given to patients has been top-of-mind for radiologists and technologists. The industry continues to innovate to bring radiation doses to a minimum, while maximizing the effectiveness of their equipment.

For its part, Toshiba Medical announced a clever way of doing this in its fluoroscopy system.

Called Spot Fluoro, a work-in-progress, the system allows the operator to collimate (focus down) on an area of interest, such as where a stent or coil is being placed. This area takes up a small portion of the display screen. Meanwhile, the operator can still see a large area of the patient's anatomy, as the system has captured a 'freeze-frame' and displays it simultaneously. The live radiation, however, is only being focused on the small area of interest.

"You're saving the patient from receiving a lot of radiation," commented John Morra, who works as a senior clinical consultant for Toshiba Medical of Canada.

He explained that in any procedure where you fluoro for a long time, the patient will get a lot of radiation. Toshiba has produced a second innovation that helps monitor the dose – letting the radiologist or technologist know that it's time to stop or to move the beam. It's a work-in-progress called the Visual Tracking System, and it presents a striking visual chart on a screen, using colour bars in real-time, to alert the operator that radiation limits are being reached.

"When it hits the red, you should adjust the C-arm and image in a different position," said Morra. "It's especially important in pediatrics, where the patients are very sensitive to radiation."

Several companies have recently emerged with applications that chart the radiation patients are receiving over a period of time. Radimetrics, of Toronto, made waves in recent years with its breakthrough software in this area. Using the system, you can monitor the amount of radiation a patient is accumulating, from a variety of modalities and even in different hospitals. You can also check to see if various machines are emitting too much radiation, or if radiologists and technologists are ordering too many exams or use protocols that involve too much radiation. There's feedback in all of this, too, as you can reduce the exams given to patients who seem to be receiving too much radiation. You can also inform radiologists and technologists that their orders and protocols could be improved.

To the surprise of many, it was announced during the

Dose Tracking



TOSHIBA
Leading Innovation >>>

Toshiba's Dose Tracking System, a work-in-progress, uses colour bars in real-time to alert the operator that radiation limits are being reached.

RSNA meeting that Bayer had purchased Radimetrics for an undisclosed amount, and was making a bigger push into the diagnostic imaging marketplace.

Meanwhile, Agfa announced that it has produced a similar product, a system that monitors the radiation dose produced by equipment and accumulated by patients through multiple exams. The system also makes use of algorithms that account for the age of patients, the organs being imaged, and other factors, to determine whether dosing thresholds are being exceeded.

The Agfa solution, which was devised in Canada and will be sold worldwide, is currently being tested by the Queen Elizabeth Hospital, part of Capital Health in Halifax. Having such a system provides care-givers with analytical tools.

"The idea is to have an enterprise-wide record of patient exposures," said Andy Hind, vice president at Agfa Canada. "It allows you to ask whether a patient should have another scan, and to compare radiation exposure at different hospitals. You start asking, why is CT exposure at one hospital higher than at another?"

Additionally, by comparing doses and the effectiveness of exam results, "You can develop standards," said Hind. "You can determine, for example, what the dose should be for a head and neck scan." In this way, protocols can be standardized across an organization, to optimize the dose so that results are maximized and X-ray exposure to the patient is minimized.

Computed Tomography: At the same time, technology developers continue to drive down the dose emitted by their equipment while further improving their imaging abilities. A case in point is Toshiba, which announced its most advanced CT system – the Aquilion ONE Vision Edition. According to the company, it offers the largest bore [opening] and the thinnest slices on the market.

The new machine boasts a gantry rotation of 0.275 seconds and 320 detector rows that cover 16 centimetres in a single rotation. Each image slice is only 500 microns. Due to the wide bore and fast rotation, the Aquilion ONE Vision Edition can accommodate the heaviest of patients and those with high heart rates.

The system also sports Toshiba's third-generation dose reconstruction software, AIDR 3D, which is said to incorporate improved imaging while reducing the X-ray exposure to patients. "We're now dealing with microSieverts of

radiation, not milliSieverts," commented David McDougall, CT product manager, Toshiba of Canada. "We're getting close to the radiation level of a chest X-ray."

As well, the fast imaging is ideal for cardiac exams, as it can capture the entire heart in one beat, thereby reducing the blurring that occurs from the motion of the heart.

The new Aquilion ViSION is scheduled for installation at the University Health Network in Toronto in early 2013, in association with a research agreement. The Aquilion ONE, which is also a 16 cm 4D Volume CT, is installed at 19 sites across Canada.

One of these installs, noted McDougall, is in Corner Brook, Newfoundland and Labrador, where it enables

In recent years, the need to reduce the X-ray doses given to patients has been top-of-mind for radiologists and technologists. The industry continues to work toward this goal.

physicians to conduct top-flight exams without sending patients to larger centres, such as St. John's or Halifax.

Toshiba Medical Systems also offers the Aquilion Prime, a scanner with an 80 detector row that's capable of producing 160 slices per rotation – an effective technology for community hospitals. The first installation in Canada, said McDougall, went into Cowansville, Que., in February 2012; and during the RSNA conference in November, an Aquilion Prime went live at the Collingwood General and Marine Hospital, in Collingwood, Ont., while another was being installed in Dunnville, Ont., at the Haldimand War Memorial Hospital.

"Collingwood went from an old four-slice machine to the new 160-slice, Aquilion Prime," said McDougall. "They wanted a scanner capable of a range of exams, including trauma, bariatric work and pediatrics." It's an impressive jump in capabilities, and it's made possible by changes in pricing and shifts in medical practice.

MRI: GE Healthcare raised the eyebrows of many with a new MRI technology called Silent Scan. It addresses a major problem in most MRI exams – the horrendous noise. In fact, MRI scans are typically as loud as a jetliner or rock concert, and it's difficult for many patients to remain still for four to five minutes while in the

closed, noisy MRI tunnel. “An anxious patient can be alarmed, forcing you to conduct the exam all over again,” commented Baldev Ahluwalia, premium segment manager, global MR business at GE.

In contrast, the Silent Scan technology, which is currently awaiting approval by the FDA in the United States, counteracts the noise and creates a near-silent environment. And the technology adds only 20 seconds to the duration of an exam, said Ahluwalia.

GE Healthcare said that traditional forms of noise mitigation in MR systems have focused on muffling the sound made by the scanners. This new approach treats the sound at its source, using high-fidelity gradients, ultra-fast radio frequency technology and an improved 3D reconstruction technique called Silenz.

For its part, Philips was touting its No. 1 MRI rating in a recent KLAS report. In particular, Philips was showcasing its SmartPath to dstream technology, a digital solution that boosts the signal-to-noise ratio by up to 40 percent.

As well, the company is claiming that recent workflow improvements are resulting in up to 30 percent increases in patient throughput – something that should be of interest to imaging centres that have wait lists for MRI.

A Philips spokesperson cited automation of processing and improved coil handling as two of the reasons for the throughput improvement.

On the cutting-edge of MRI research, Philips has been working with Yale University and Case Western Reserve University to determine which drugs would be most effectively used to treat breast cancers, based on the texture of the tumour. It has been found that sub-types of breast cancer can be identified through MRI images, and these sub-types respond best to certain medications. In this way, more effective therapies can be developed for women in the fight against breast cancer.



Siemens has produced the world's first wireless ultrasound.

Molecular imaging: Siemens announced a breakthrough in the diagnosis of Alzheimer's disease, with a solution that allows clinicians to determine the presence or absence of the disease in a living patient. It's said to be the first time this can be done in a definitive way – other tools and assessments are all inconclusive when it comes to diagnosing Alzheimer's in a living and breathing patient. Only an histological exam in a post-mortem could positively spot the presence of Alzheimer's disease.

Now, however, Siemens has put together a three part solution that can even recognize early onset Alzheimer's.

The system makes use of the company's mCT PET scanner, for which it developed a special radiotracer. (It did this in alliance with the pharmaceutical giant Eli Lilly. That's why Eli Lilly had a presence at the RSNA last year.)

Siemens vice president for molecular imaging, Alexander Zimmerman, noted that it's one of the first radiotracers made to detect a specific disease. Because of the magnitude of Alzheimer's, Siemens has established nine sites across the United States to produce the tracer, which has a half-life of 112 minutes. It's planning on establishing an additional 16 manufacturing sites.

The F18 radiotracer is able to attach itself to the amyloid plaques that disrupt signals between neurons in the grey matter of the brain. It's the presence of the plaques,

detected by the high-sensitivity PET scanner, which enables clinicians to determine whether a patient has Alzheimer's.

But Zimmerman points out that a third component of the solution has been devised to effectively make the assessment – it's software that assesses six zones of the brain and

determines whether plaques are in the grey or white matter. Buildups in the white matter are normal, but amyloid plaques among the grey cells are a serious problem. The software, devised in conjunction with clinical experts, can help physicians make a definitive diagnosis.

Zimmerman said this is an important step, as “one out of five people diagnosed with Alzheimer's do not actually have it.” The 80 percent with other forms of dementia can be treated, he asserted, while those with Alzheimer's cannot.

This can lead to a change of medications for those without Alzheimer's, said Zimmerman. For those with the disease, there is the chance to get one's affair in order. That could involve spending more quality time with loved ones, seeing the world, and setting up the resources to deal with later stages of dementia.

It could also include enrolling in clinical trials of new medications. While many see a diagnosis of Alzheimer's as a death sentence, there has been an explosion of research of late and new treatments are on the horizon. Additionally, the United States launched a \$156 million National Alzheimer's Plan last year to tackle the disease, which is also energizing the field. Effective treatments may yet appear.

Direct radiography and PACS: In the area of direct radiology, Canadian innovator Imaging Dynamics Corp., has been going through various management changes in recent years but is still keeping its hat in the ring. In particular, the Calgary-based company has been lauded for the quality of its software, called Magellan. It recently won a \$30 million order from China for CCD technology and flat panels, and IDC has also been working with international health groups on the eradication of TB worldwide.

Interestingly, the company is now selling a mobile X-ray unit using hardware that is manufactured in Italy; IDC has added elements of its own Magellan software.

Other companies announced DR panels, including Rayence of South Korea, which is selling new and innovative panels through Canadian distributor Nuon, of Edmonton.

Nuon, headed by Mark Little, is also leading the charge to expand the of PACS and enterprise imaging solutions from Visage Imaging, of San Diego, into Canada. Visage Imaging is a subsidiary of Pro Medicus, of Australia; the company already has several installations in Canada, and the plan is to capture additional sites by showing Canadian users its combination of attractive price and advanced features – including fast access to all types of studies using thin-client technology. The solution, Visage 7, is said to offer access to radiological studies and information in multiple locations, without replicating the data.

Healthcare analytics: useful, but challenging

CONTINUED FROM PAGE 13

Office's associate director of legal services and its senior health law counsel. “Now in healthcare, having volumes of data about patients aggregated anonymously together can be of great benefit, to be sure: we can inform clinical practice guidelines; we can evaluate the healthcare services being provided; and we can allocate resources.”

“So then why should we care about privacy?” asked the conference rhetorically. And answered: “If individuals lose confidence in the ability of our healthcare system to protect their privacy, then it tends to trigger what we term ‘privacy protection behaviours’ that are not good.”

“They start falsifying information they provide; they start seeing multiple doctors so that no one clinician can get an accurate picture of their health. Or they withhold information, or they do not take treatment.”

To support that view, DiRe cited a recent study conducted by the California Healthcare Foundation. “They

De-identification of the data is important, as patients will lose faith in the healthcare system if their information is used without their permission.

found out that one in six Californians admitted to either falsifying their information, withholding information, or seeing multiple doctors – given their concerns about the healthcare system protecting their privacy. And don't think it isn't happening in Canada, too.

“Another survey here found that 1.2 million Canadians had withheld information from their care provider for the same reason.”

Yet DiRe and her co-presenter Debra Grant, a senior health privacy specialist in the Privacy Commissioner's office, believe privacy is not the beast believed to be standing in data analytics' way.

“In Ontario, there is strong ‘data minimization’ legisla-

tion to protect privacy that's really based on the principle of less is more,” said Grant. “So for instance, it is against the law for any researcher to gather healthcare information about specific individuals or groups if aggregate, anonymous data will suffice.”

It is the “de-identification” of healthcare data, including making it very difficult for anyone to even find your health insurance card number that is the focus of privacy efforts in Ontario.

But it is in Manitoba where Canada's and likely the world's greatest healthcare collection of big data reposes, and where the greatest expertise on how to use it may also lie.

“The data repository we hold is immense and it's been a labour of love for 22 years since our organization began,” said public school teacher turned PhD researcher Dr. Patricia Martens, the head of the Manitoba Centre for Health Policy, based in Winnipeg. She charmed the conference with an amusing and illuminating talk on “The Need to Know: Establishing a Robust and Sustainable Health Information Collaborative.”

Before delving into the details of the Centre's Population Health Research Data Repository, located at the University of Manitoba in Winnipeg, Dr. Martens put up a PowerPoint slide of a road-side sign in Alberta warning of a potential deer crossing.

She said she noticed that the sign was different from the ones she remembered in Saskatchewan and Manitoba. Each deer was portrayed differently: jumping or walking in opposite directions, or differing in size, shape, and colour. Having spoken on data and repository management at conferences around the world she has continued to use the deer slides to illustrate how difficult it can be to standardize even the simplest kind of data. Now, her deer slide collection has gone viral. People have sent her dozens of deer crossing slides from countries at all points on the compass – none of them the same.

“Just as in healthcare, there are challenges when it comes to standardizing real world observational data in particular,” said Martens.

Under pressure from all sides, radiology must now re-invent itself

BY DR. DAVID KOFF

At the recent Radiology Society of North America (RSNA) meeting in Chicago, held in November, all was about the patient. All of a sudden, everybody discovered that the patient is at the centre of the episode of care and that he or she is the one we should care for.

A lot was said about the role of the radiologist and how we need to position ourselves within the clinical team. At the Monday plenary session, Dr. Paul Chang, chief of Medical Informatics at Northwestern University, Chicago, reminded us his father, a family physician, saying that the radiologist is the doctor's doctor, the one the clinicians come to for an imaging consultation. It is not perceived that way anymore, as the PACS and other electronic tools have resulted in more isolation for the radiologist.

Paul Chang is advocating the use of social media such as Twitter and Facebook to improve communication. Some of my colleagues are taking their COWs (Computer on Wheels) or portable devices to the floor, to follow the clinical team at the bedside and to provide instantaneous advice on imaging. Whatever methods we implement, we have to make sure that our clinical colleagues are satisfied with our services and communication.

At a time where the word is to fiscal responsibility and conscious utilization, the landscape is changing and to quote Yogi Berra, "the future is not what it used to be".

What I heard repeatedly at management and leadership radiology meetings in North America and Europe is that there is a brilliant future for radiology, but maybe not for radiologists. After more than forty years of constant growth, the activity has reached a plateau, or may have started to decrease.

The job market in this country is not as welcoming for young radiologists, as the older ones don't readily retire in this time of financial uncertainty, and practices are reluctant to recruit. In the United States, there is growing competition from non-radiologists when it comes to reading DI exams, a trend that we start seeing here. Ominously, RSNA saw a 9 percent decrease in attendance as a lot of American practices struggle with meaningful use.

Governments all over the world are trying to contain rising healthcare costs, and radiology is under attack as a cost driver. Keith Dreyer, vice-chair of the department of radiology at Massachusetts General Hospital in Boston, explained that in the U.S., the government is looking at fee-for-service alternatives such as bundled payments and accountable care organizations shifting the risk from the payers to the providers and service lines.

Here are a few changes that will affect the profession in the coming years.

- Decreasing reimbursements. In Ontario, the Ministry of Health has decreased the radiologists' fees this year by 5 percent, part of a four-year plan to control spending. But the major change will probably be the healthcare funding reform with the adoption of Health Based Allocation Model (HBAM) and Quality Based Procedures (QBP); it is changing the way hospital are funded, moving away from Global Budget (which will decrease to 30% by 2014) to an evidence-based distribution of funding including specific disease (case mix groups), socioeconomic status, geography. This new approach is based on case costing per patient, including all elements of the episode of care for a specific condition. Radiology will be part of this cost with no margin to expand. Wait-time funding controls the

amount of operating hours allocated to CT and MR, and can be decreased once provincial targets have been met.

- Decreasing consumption. By promoting appropriateness, the Ministry and the LHINs hope to limit the number of useless requisitions. Starting this year, imaging for isolated low back pain is not indicated anymore. There have been attempts to implement Computerized Physician Order Entry (CPOE) with decision support software solutions to help the referring physician to choose the appropriate test or procedure, using the evidence-based appropriateness criteria crafted by the American College of Radiology, or by the Canadian Association of Radiologists; this approach has

not been successful due to cost and a perceived punitive approach, which resulted in physicians overwriting the system.

Emphasis is now more on education, and we have initiated a series of sessions at McMaster University, called Decoding Diagnostics, where we explain to family physicians and health professionals what is the state-of-the-art approach to a given condition. This year, we covered low back pain, lung nodules, headaches, knee pain and breast imaging, and all presentations were given jointly by a family physician, a specialist and a radiologist. You are welcome to check the conference website at www.decodingdiagnostics.ca.

- Cost of radiologists. Even if we are not there yet, it may be tempting to defer some of the radiologists' tasks to more cost ef-

fective healthcare professionals, such as technologists, nurses and radiology assistants. In the U.K., technologists perform ultrasounds and issue reports with no radiologist's supervision.

- Quality improvement. Canadian radiology has been shaken by a number of highly publicized reviews of radiologists' activities, from coast-to-coast, resulting in suspensions and mainly loss of trust in radiologists' expertise. A high profile case in British Columbia led to the publication of the Cochrane report, enjoining radiologists to implement a province-wide quality assurance process. In Ontario, the Excellent Care for All Act, 2010, makes quality a priority and asks hospitals to implement quality committees to report quality-related issues.

Like in the airline industry, radiology needs to move away from blame culture and focus on the overall improvement of systems and patient care.

For radiologists, the quality reviews may be retrospective, but it is better to implement a fully automated, actionable, non-punitive prospective process, allowing for real-time feedback and outcomes improvement, in a spirit of improved quality and patient safety.

So radiology is at a turning point and needs to re-invent itself to face the multiple challenges I have briefly outlined, including communication, quality and funding. These are long overdue adjustments that the profession has to understand, but overall imaging will remain an indispensable component of the chain of care.

Dr. David Koff is Associate Professor and Chair of the Department of Radiology, McMaster University. He is also Radiologist-in-Chief in the Department of Diagnostic Imaging, Hamilton Health Sciences.



Dr. David Koff

DI delivers more capabilities, but implementation is more challenging

BY THOMAS HOUGH CMC

RSNA 2012 confirmed that important changes are occurring in the DI and healthcare IT sectors, as technologies converge and more demands are made for improved efficiency, effectiveness and quality. I have summarized several of the trends that are occurring, based on my recent experiences and from my visit to the RSNA 2012 meeting.

- PACS Vendors – Investment in PACS is continuing with some vendors developing new functions and features at a faster rate than others, the result is a bigger technology gap between some key vendors;

- Advance Viewing applications are coming of age and migrating from separate servers into integrated solutions within Diagnostic Workstations. They can be launched through advanced hanging protocols for disease specific detection, with 3D apps displaying in one second. Firms like Philips Medical have extensive Advanced Viewing disease spe-

cific apps, such as CT Pulmonary Embolism Assessment and CT-NM MPI Cardiac Fusion, to mention just a few.

- Regional archives, or as we refer to them in Canada, Diagnostic Imaging Repositories (DI-r), have come of age globally with installs in Europe, England, Australia, New Zealand, Canada and the United States. The key to the success of knowing where all images and reports are regionally is found in XDS and XDSi. Unfortunately, not every jurisdiction has figured this out yet.

- Firms like Acuo from Minneapolis have developed middleware solutions for problems the Canadian DI repositories are facing. With multi-PACS RIS, HIS, EMR vendors and different MPIs deployed provincially hampering the ability to deliver a longitudinal patient health record, firms like this can solve inter-operability issues today and prevent huge replacement costs of storage infrastructure tomorrow;

- The PACS replacement market continues its growth with a number of key changes. Buyers should be looking to buy PACS without the "A". Picture Communi-

cation Systems are now the order of the day. Buying PCS has gotten much more complex due to the convergence of EMRs, DI-r, and the new functionality found in Advanced Viewing Workstations. Engaging knowledgeable competent assistance in the procurement will avoid even more costly mistakes, now that the bar has been raised by regional integration.

- The implementation of a replacement PACS can now cost the same or more than a PACS itself. PACS has become ubiquitous throughout the healthcare enterprise – when changing from one user interface to another, and from one data storage system to another or to a Vendor Neutral Archive. Now, new groups requiring training will lead to costs not experienced previously.

- Vendor Neutral Archive is the current hot topic. How do you define this

and does it mean the same thing from one healthcare provider to the next? Not likely. In an article later this year I will define the meanings and implications of VNAs, along with a commentary on their cost.

- Most vendors at RSNA 2012 featured analytics in one form or another, demonstrating that Business Intelligence has now come of age in the diagnostic imaging sector. The US market "gets" the value of analytics in DI, while Canadians tend to remain aloof on this subject – largely as a result of the different drivers of healthcare delivery in publicly funded Canadian provinces and the for-profit U.S. hospitals and clinics.

- Vendors such as Philips, Intelrad, GE, Agfa, and Carestream, to mention a few, are clearly showing that RIS/PACS/Cardiology are on the path for convergence in their solutions. CVIS solutions have matured tremendously in the past 20 months and offer complete solutions for all disciplines within cardiology. The integration of these systems through virtualization on

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Thomas Hough

Tele-trauma

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condition, and early intervention is critical in the process to optimize outcomes.

"But trauma is still pretty rare and episodic at a lot of the sites," says Hicks. The pilot project's intake has been, on average, one or two cases a week over the past year, he says. That patient load may rise in 2013 if the three additional non-trauma hospitals come onboard.

There haven't been enough cases yet to permit an evaluation of outcomes. A study, however, is being done to examine whether the project improves transport times between non-trauma and trauma centres. (Transfer from a northern Ontario hospital to a trauma centre has been subject to long wait times, taking from six to 11 hours.)

"If the network were used in the care

of all trauma patients," says Hicks, "it would have a potential role for keeping more of them where they are" – at the non-trauma facilities – instead of being transferred. As it is, the project was designed to accept mostly critically ill patients who require transport.

"We wanted to get patients with multi-system injuries," says Hicks. "Our numbers are skewed toward penetrating traumas, e.g., stab wounds and gunshot wounds, because that's the sort of injury that a lot of non-trauma hospitals are just not that familiar with." (In contrast, the majority of trauma patients in Ontario have suffered blunt trauma, mainly from vehicular accidents.)

"There have been a few cases where I've really seen the value of having a video image over just a phone conversation" with the referring physician, says Hicks. "When you're just talking on the phone, you're a bit at the mercy of what

the person tells you and what you remember to ask. When you're looking remotely at the patient, you get a lot more information, judging how severe their injuries really are."

Whereas with the old system of transport, the receiving hospital would call for the trauma patient to be transferred later

The solution is particularly useful for patients with multi-system injuries, caused by stab wounds and gunshot wounds.

in the process, "we're encouraging the hospital to call us right at the beginning of the patient-care encounter," says Hicks. "That allows us to intervene early and help make decisions on transport early. It helps unclog their [ER] departments, too."

In one case, a patient received at a non-

trauma hospital had a stab wound to the chest. Hicks, using the high-speed video link, could see that the wound extended to his diaphragm and belly. "I suspected that he might have an injury to his liver and intervened to say that the patient should be taken to a trauma centre for a CT scan. We were able to speed up his time from mucking around at the referring site to getting him over here quickly."

The 3T network hopes to introduce mobile devices for its consulting MDs early next year.

These will free the doctors from having to be tethered to work stations at the trauma centre (or sticking close to their home computers when on call.) We have already piloted a mobile version of the project with simulations using a computer-controlled mannequin of a patient," says Hicks. "We've piloted on the iPad, and the images are fantastic."

If the 3T network were extended to all of Ontario, all non-trauma hospitals would be equipped with telemedicine capability. A single trauma doctor would be on call for the province, providing real-time clinical support and assisting in transport decisions and management of regional trauma resources. But that province-wide coverage may happen only gradually, says Hicks.

"You have to have enough [patient] volume that it makes sense to ask a trauma specialist to sit home all night at their desktop computer when they're not all that likely to get a call, more often than not. This is where the mobile devices come in. The technology is there. It's a matter of getting OTN and the Ministry of Health to be comfortable with the notion of using video conferencing for patient care."

North York General Hospital sets HIMSS Stage 7 in its sights

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implementation has been a very good thing at NYGH, evidenced by streamlined efficiencies, reduced costs and better patient outcomes.

Since implementing these new systems and processes NYGH has experienced a consistent decrease in the number of medication errors, including administration to the wrong patient and/or administration of the incorrect drug and incorrect dosage or strength. During the first year of using closed-loop barcode scanning (August 2011 to August 2012), just over 1,400 patient mismatch alerts involving 2,664 different drugs were prevented.

Prior to implementing CPOE and closed-loop barcode medication administration systems, there was no reliable way of accurately documenting medical administration errors. The barcode scanning system enables us to capture this important data.

NYGH now monitors compliance with medication scanning at the point of administration. After deploying the new technology, we set a scanning compliance target of 85 percent for staff. After achieving this goal in little less than a year, the

scanning compliance target was increased to 87 percent and that goal was met in approximately four months. The most recent scanning compliance target is 90 percent,

There was no reliable way of documenting medical administration errors prior to the use of the new systems.

and we are on track to reach it. These numbers tell us we are improving our quality of patient care.

Sharing the challenges and best practices used to introduce medication administration automation and alter workflows is one of the best parts of my job. Every organization is different, and so are their technology needs, but developing a project management strategy based on the necessity of staff engagement at the outset gives health implementations the greatest chance for success.

Sonia Pagliaroli is Manager of Clinical Informatics at North York General Hospital in Toronto, one of Canada's leading community academic hospitals.

Telemedicine in Thunder Bay to create a virtual hospital

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saved in travel funding, it is important to consider the soft costs and impact of time away from work on a wider, socio-economical scale. Many patients travel with a family member, and both may be taking time away from work to travel.

Telemedicine has seen impacts across

clinical disciplines. Providers, from physicians to social workers, value this service on behalf of patients. What follows are a few comments:

• "I can follow my patients at a distance; patients access me faster for follow up care without the need to drive hundreds of kilometres. Telemedicine provides faster, safer care for patients." Dr. Bill O'Hara, Di-

vision of Gastroenterology, Department of Internal Medicine, TBRHSC

• "Tele-visitation has been a therapeutic experience for our client who has been using it on a weekly basis over the winter months. Tele-visitation has proved invaluable and appears to have enhanced his mental health. It has provided opportunity for meaningful contact with family members with whom he had not had face-to-face contact for over a year. He has gained the familial support he needs to continue adjusting to living in a strange community." Comments by psycho-social worker, TBRHSC

In preparation for the future, we continue to search out gaps in service and technologies. We have identified promotion as a key to our continued success and attempt to match providers with clients requiring their services. As leaders in the delivery of telemedicine services we strive to move forward to meet the challenges that new and exciting technology advancements offer. The vision of the Parallel Virtual hospital and the model of integration of telemedicine into every service, with central support, has created a sustainable, high quality alternative for access to health services for the residents of Northwestern Ontario.

Trina Diner is Manager of Palliative Care and Telemedicine, Thunder Bay Regional Health Sciences Centre. Anne Cryderman, RN, is Coordinator of the Telemedicine Program, Thunder Bay Regional Health Sciences Centre.

DI delivers, but implementation can be challenging

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hardware and the sharing of Patient Identification Numbers (PIN) are only logical. Being able to view the complete patient record between DI and cardiology is needed and logical and makes the PCS replacement process more complex than ever.

• All vendors like to claim they can integrate with Electronic Medical Records (EMRs). However, like the VNA, there are nuances and gradations to be dealt with. Another good discussion is to be had on where the lines are drawn on who does what and provides what relative to workflow and the supply of data. One thing is for sure, if the EMR and all the supporting information systems do not get it right this time around then the implications and the costs for

making corrections will be huge and complicated to undo. Once again, having experienced and knowledgeable people who have done this before is a requirement to lead this kind of high-level IT initiative.

• Finally, who is going to provide the regional image viewer embedded in the

All vendors like to claim they can integrate with electronic health records, but there are gradations of integration.

EMR as it relates to a DI-r or for whole province? There will be fierce competition among vendors and the outcomes will dictate long-term relationships within healthcare jurisdictions or

provinces. Philips has reported through statistics gained from the use of their "Viewer" in lower BC mainland region that 72 percent of all images were viewed again outside the DI department. This percentage continues to grow with no peak anticipated. Selecting the right viewer can have a big impact in how images and reports are going to be used going forward. Get it right and quality in patient care improves. Get it wrong by not being able to deliver images and reports for a wide variety of reasons will cost the tax payers of Canada a more than a lot of money to fix. The implications are huge.

Thomas Hough CMC is founder and President of True North Consulting & Associates Inc. The company is based in Mississauga, Ont. www.truenorthconsult.com

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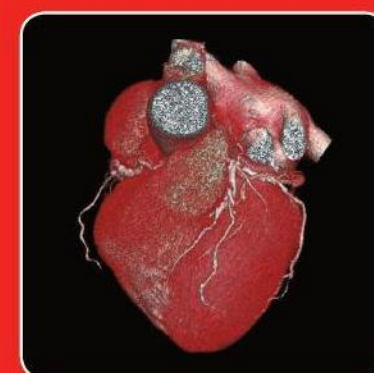
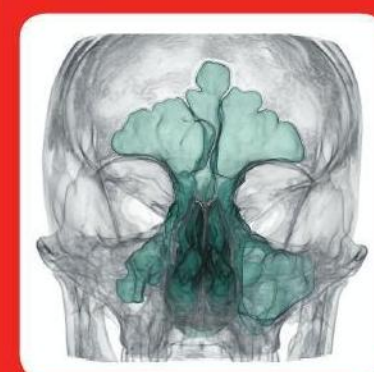
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