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PHOTO: COURTESY UNIVERSITY OF OTTAWA HEART INSTITUTE

Pocket ultrasound a hit at the Ottawa Heart Institute

Cardiologists at the University of Ottawa Heart Institute are finding that pocket ultrasound can be more useful than the traditional stethoscope – in 20 percent of cases, it can actually find more useful information than a stethoscope. It is also more practical than regular ultrasound machines in emergency situations. Pictured above are Dr. Benjamin Hibbert and Dr. Michel Le May. **SEE STORY ON PAGE 4.**

Virtual ICU provides care across northeast Ontario

BY JERRY ZEIDENBERG

SUDBURY, ONT. – Intensive care professionals are now able to provide their expertise to 16 hospitals across northeast Ontario through the Virtual Critical Care unit, an advanced telehealth system headquartered at Health Sciences North.

In January, the Virtual Critical Care (VCC) unit added seven smaller hospitals to the nine it was already reaching, enabling a team in Sudbury to offer around-the-clock support to remote critical care units and emergency departments that are often understaffed.

Joining the network are the emergency departments at Espanola Regional Hospital and Health Centre; Manitoulin Health Centre (Little Current and Mindemoya sites); Blind River District Health Centre; Chapleau Health Services; Mattawa Hospital; and Lady Dunn Health Centre in Wawa.

Using videoconferencing and access to electronic medical records, VCC team members can guide nurses and physicians at any of the 16 hospitals on the care needed by critically ill patients, including those suffering from trauma, severe infections, cardiovascular and lung failure, and other illnesses.

"In recent years, larger cities with academic hospitals have developed teams of intensivists, critical care nurses, respiratory therapists, pharmacists and dieticians," said

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Virtual Critical Care unit now provides care across northeast Ontario

CONTINUED FROM PAGE 1

Dr. Derek Manchuk, lead physician of the VCC unit, critical care lead for the NELHIN and medical director of critical care for Health Sciences North. "Together, they have been shown to improve outcomes – such as mortality – and to reduce costs and length-of-stay."

He asserted that smaller centres don't have the benefit of these multi-faceted teams. The idea behind the Virtual Critical Care unit was to use high-powered videoconferencing to bring the knowledge and experience of an established intensive care team to remote hospitals.

"We're able to give them equal access to care," said Dr. Manchuk, adding that most remote hospitals have medical equipment, drugs and ventilators. "What they're missing is all of the team members. And the smaller hospitals often don't have the benefit of the experience that comes with high case volume."

By videoconferencing with specialists at the Virtual Critical Care unit, rural physicians and nurses are often able to avoid transporting them to a larger, acute-care centre. Moreover, physicians in larger community hospitals obtain the benefit of second opinions on complex cases without transferring their patients.

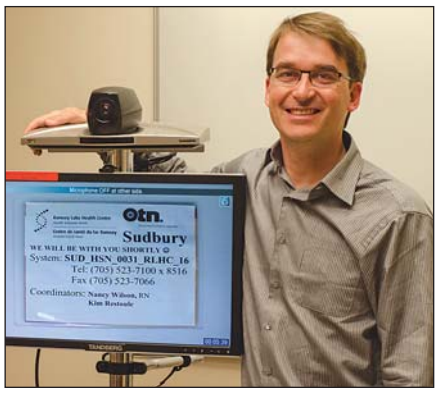
That's expected to improve outcomes for patients and reduce costs to the healthcare system, since transporting patients from rural areas can be hard on the patient and often requires an expensive air ambulance.

In the last year, the Virtual Critical Care unit has saved $450,000 in transportation costs by avoiding air ambulances and treating patients in their home communities.

Moreover, when it's decided that moving a patient to Sudbury is the best course of action, the intensivists are able to start earlier on the appropriate medications and ventilation. In that way, patients arrive in better shape upon reaching the acute care centre.

Recently, a patient in the emergency department in Kirkland Lake suffered a heart attack. As the patient's condition worsened, staff at the hospital contacted the Virtual Critical Care unit.

"We coached them through CPR and medications, and they did the resuscitation," said Dr. Manchuk. "We also had them use a portable ultrasound, and we could see the images on our screen and comment."



Dr. Manchuk leads the virtual critical care unit.

To create the Virtual Critical Care network, Health Sciences North partnered with the Ontario Telemedicine Network to create a high-powered system, including a new three-way videoconferencing interface.

This means the video system can support clinicians at the unit's headquarters in Sudbury, doctors and nurses at any of the remote hospital sites in northeastern Ontario, as well as critical care physicians who might be away from the Sudbury nerve-centre but want to assist with the case.

In addition to the team in Sudbury, three critical care physicians in southern Ontario have been assisting the Virtual Critical Care unit, one from Kingston and two others from Oshawa.

When caring for a patient, the team also has access to the patient's electronic health record and radiology images, which can be viewed on the system. It's helpful that most hospitals in northern Ontario make use of a shared Meditech electronic patient record system.

For its part, the team in Sudbury has the help of 13 ICU physicians, along with nurses who have been given special training in both critical care and telehealth. Respiratory therapists, pharmacists and dieticians are also available.

The Virtual Critical Care unit has an operating budget of $1.2 million a year, and each of the 16 remote sites has been "gifted" with a videoconferencing station – a cart with a large monitor, computer, camera and software.

Dr. Manchuk observed that the project uses a 'passive telemonitoring' model rather than the active telemonitoring that's sometimes found in the United States. With active telemonitoring, large centres staffed with physicians and nurses provide around-the-clock surveillance of remote critical care beds. They are able to view patients using cameras and have connections to their waveforms and vital sign instruments.

By contrast, with the passive telemonitoring used by the Virtual Critical Care unit in Sudbury, hospitals "call us when they need us," said Dr. Manchuk.

The team can then start monitoring the patient using cameras and instruments, and some sessions have lasted up to three hours – until the patient has been stabilized or a decision has been made to transfer the patient to Sudbury. The team also provides follow-ups, checking on patients afterwards.

Dr. Manchuk pointed out that three studies have been performed in the United States to compare active and passive monitoring of ICU patients, and all have found outcomes in passive telemonitoring to be as good as the active variety.

As well, active telemonitoring is very expensive, and costs in the area of $125,000 per bed each year. Using this model, the 40 critical care beds alone being covered in northeastern Ontario would cost $4 million to $5 million each year to monitor. Additionally, the service is available to all of the emergency departments of the hospitals that are participating.

Dr. Manchuk believes his team can achieve equal results with the current model and budget of $1.2 million a year.

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Mobile technology gives home-care managers access to real-time data

BY DAVE WEBB

With the increasing demand driven by Canada's aging population, home care organizations have to wring more and more efficiencies out of a mobile and often remote workforce. Despite the obvious opportunity for mobile technology to streamline workflow, until recently, home care has been a largely paper-and-fax-based industry.

That's changing.

At Revera Inc., which serves 25,000 clients a week in six provinces, nurses, therapists and personal support workers (PSWs) relied on a labour-intensive system for scheduling and tracking home care visits. Check-ins and checkouts at patient homes were handled by phone. Client data and appointment-related data, like directions and contact information, were tracked on paper.

(Revera's home health division was acquired by Extendicare Inc. in January.)

"A couple of years ago, (Revera Home Health) started on a plan to move from a very manual base, where we had less than 10 percent of our staff on any kind of mobility solution, to moving toward 100 percent mobile," says Jo-anne Stone Burke, national director of strategic and operational transformation for RHH.

Revera rolled out a fleet of BlackBerry Z10 and Z30 smartphones to its frontline workers, using the Mobility Plus mobile healthcare management application from GoldCare. RHH was already using GoldCare's scheduling application; the Mobility Plus solution was an add-on, says Stone-Burke.

Registered nursing staff are also equipped with Android tablets for better access to client documentation.

On the backend, Revera is migrating to BlackBerry Enterprise Server 10 to manage and secure the devices. Though the BlackBerry and Android applications might access the server in different ways, the BES 10 server attaches an additional layer of security based on the e-mail address of the devices. Security of a patient's healthcare information is critical. But the benefits of the solution go far beyond that. Time-keeping and verification are real-time, instead of based on time sheets or telephony. That's particularly important with "not seen/not founds," says Stone-Burke.

"If you're waiting for a timesheet to find out if a visit was actually made, that's a little too late," she says. By having the technology in their hands and having them check in as soon as they walk into the home … if somebody was supposed to be seen at two and it's 2:15, it flags on the desktops of the co-ordination staff that somebody is not where they're supposed to be. You can escalate and find out why they're not there and reschedule if required."

AlayaCare's Neil Grunberg, with Acclaim's Sandra O'Neill, Angela Brewer, and Laura Bjerno.

Saint Elizabeth Health Care's Roy French and Paresh Manek.

Oakville, Ont.-based Acclaim Health went a different route to mobilize its nurses and PSWs. Rather than migrate to a new in-house server, Acclaim elected to go with a cloud-based platform from Toronto startup AlayaCare Inc.

"We had a mobile documentation system for our nurses, which we quite liked – we weren't unhappy with it. It's just that we were looking for an end-to-end solution, something that could do our scheduling for us, documentation, and mobile time and attendance," says Angela Brewer, Acclaim Health's CEO. Before, scheduling and documentation were on different systems that didn't interact, and Acclaim had no mobile time and attendance solution at all.

And elements of the pre-existing solution lived on different servers: one onsite, one hosted on an external server. Bringing together a single solution in a cloud environment at a facility in Montreal gave Acclaim more flexibility and redundancy, Brewer says.

AlayaCare bills its cloud platform as an end-to-end solution – from scheduling, time-reporting and documentation, through remote patient monitoring and patient-facing health portals.

Extending the platform to in-home patients is a natural evolution of mobile home care, says Saint Elizabeth Health Care CIO Roy French, who adds that the non-profit organization is in its "Mobility 2.0" phase, and looking to the future.

Before Saint Elizabeth started leveraging mobile technology, "there was a lot of paper flying around," French says. Mileage, hours, schedules and care plans were captured on paper, faxed back and forth, and manually entered into spreadsheets and sent to head office. The first step on Saint Elizabeth's mobile journey was to equip frontline workers with BlackBerrys. Scheduling information was pushed out (and updated every half-hour), and time and mileage pulled in, through an application suite supplied by CellTrak.

"We eliminated a whole bunch of old, tired, manual processes and automated them," French says. "So the turnaround for expense for mileage and travel time was a lot faster than it used to be in the past."

That was about five years ago. Now, Saint Elizabeth is rolling out a pilot project, handing 5,000 of their frontline workers Samsung Galaxy Tab S 4G tablets. "(The tablets have) given us a great deal more real estate to work with," French says. "The little two-by-two window on the BlackBerry does not lend itself well to doing complex assessments."

The tablets' larger screens also allow Saint Elizabeth to roll out more applications to its nurses and PSWs – a learning portal with documentation and video, self-serve access to HR platform PeopleSoft, the ability to view pay stubs online, and a social media "suggestion box" platform called SoapBox among them.

Pocket echo has advantages over the stethoscope

OTTAWA – A device about the size of a smartphone is now enabling cardiologists at the University of Ottawa Heart Institute to generate images of patients' hearts at the point of care, allowing them to make more informed diagnoses and to intervene earlier. The use of this new state-of-the-art technology has resulted in improved care and outcomes and could potentially reduce healthcare costs.

The pocket echo (echo is short for echocardiogram) is a portable ultrasound machine with a cardiac probe that provides doctors with significant information about the structure and function of the heart. The equipment typically used for echocardiograms is large and bulky, and not always practical in emergency situations. Physicians at the Heart Institute are now using the pocket echo to get instant pictures of a patient's heart, right at the point of care.

"The Pocket Echo is undoubtedly gaining great momentum as a valuable, complementary tool to everyday diagnostics and we anticipate it to become part of standard practice as it adds significant data to our clinical decision making," said Dr. Michel Le May, Director of the Heart Institute's Cardiac Intensive Care Unit. Dr. Le May introduced the new device to the unit in 2013.

"Stethoscopes are key when it comes to listening to the heart and deduce what is wrong based on what we hear, but there is a certain element of imprecision," added Dr. Le May.

Over 40 years ago, the development of the ultrasound was a giant step forward. Physicians had a non-invasive way to see and take pictures of what was happening in the heart and could base their diagnosis and treatment decisions on those pictures. Called echocardiograms, these images were a substantial advance in caring for cardiac patients, allowing cardiologists to see things they could not hear when using the stethoscope.

In 20 percent of cases, pocket ultrasound yields more information than an exam conducted by stethoscope.

In roughly 80 percent of cases, the information physicians get from a stethoscope is sufficient. But about 20 percent of the time, the pocket echo offers new information that changes a diagnosis, informs a treatment plan and even guides an intervention, like the insertion of a needle to drain fluid from a chamber of the heart.

The Institute purchased its pocket echo in 2012, thanks to a generous donation. Since then, more than 5,000 images from more than 1,000 patients have been gathered. Physicians are now working through the data to determine the impact of the pocket echo on patient care and outcomes.

"It is a transformational development," said Dr. Benjamin Hibbert, a cardiologist at the Heart Institute who spearheaded the Pocket Echo's implementation at the Heart Institute in 2013, when he was Chief Resident. "When I go and practice elsewhere and don't have access to it, I almost feel naked as it's become so much a part of what I do."

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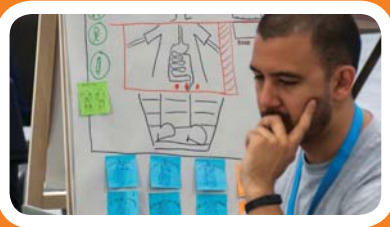

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Halifax telemedicine company provides services to global yacht race

Praxes Medical Group, of Halifax, announced that it will be the Global Medical Support Partner for the second time for the renowned Clipper Round the World Yacht Race 2015-16 edition.

Praxes provided global telemedicine support during the 2013-14 Clipper Race and use of the Praxes service helped the race increase medical support on board, while simultaneously reducing vessel diversions and insurance claims.

As a result of this highly successful partnership, Praxes and UK-based Clipper Ventures Plc have announced a new global joint venture, ClipperTelemed+, to be released globally in May 2015.

ClipperTelemed+ will provide immediate medical support from Praxes emergency and occupational physicians to yachts, super-yachts and commercial vessels around the world.

Praxes has been providing telemedicine services since 1997, and its customers include oil rigs and sea-faring vessels, along with ground search and rescue operations in Nova Scotia. The company devised its own software, which is used to triage patients and link them to 50 physicians who are able to work remotely.

Using its EMwerx software and satellite phones, Praxes guarantees clients a response time of five minutes or less, no matter where they are located around the world. Custom medical kits will also be offered to the Clipper Race participants, as part of a complete medical support service.

Praxes VP of Marketing, John Hockin, believes that the ClipperTelemed+ service will not only resonate with clients because of the efficient technology but also because of the highly personalized service provided by the dedicated emergency physicians.

Telemedicine is provided to remote sailing vessels.

The Clipper Round the World Yacht Race is the world's longest ocean race, also known as one of the world's toughest endurance challenges. The race is 40,000 miles long and takes almost a year to complete.

Twelve teams race on a matched fleet of Clipper Race 70 ocean racing yachts.

Approximately 40 percent of crew have no sailing experience before they sign up for the challenge. This is where everyone from doctors to massage therapists, truck drivers, students, nurses, and landscape gardeners join together to take on Mother Nature's toughest conditions.

The technology that supports the delivery of the ClipperTelemed+ service is a web-based software system called EMwerx. Since 2003, it has been in continuous use by Praxes' emergency medical professionals.

EMwerx is also used by Praxes medical call-centre personnel, who triage incoming calls when they're first received. Additionally, Praxes administrative and technical staff use the software to enter doctor schedules and troubleshoot any issues.

By registering such information as the doctors' schedules, jurisdictions they're licensed to practice in, and the languages they speak, EMwerx links the most appropriate doctor to each specific call that is received. For ClipperTelemed+ customers who choose to provide their medical information, Praxes physicians are able to use EMwerx to see past medical histories, existing conditions and medications being used to help facilitate diagnosis.

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Diagnostic imaging is expected to deliver definitive and timely answers to clinical questions. The ability to find these answers sooner, has made nuclear medicine a cornerstone of diagnostic imaging. Despite the high sensitivity of today's SPECT/CT scanners, the modality's limited specificity due to images that are only mechanically fused often leads to follow-up procedures that delay patient care and potentially increase costs.

To overcome these challenges, Siemens is once again pioneering hybrid imaging. Through a new alignment method that results in the total integration of SPECT and CT, a revolutionary new modality is emerging: xSPECT.

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Answers for life.

Simulation technology helps prevent OR bottlenecks in new hospital

BY DIANNE DANIEL

Humber River Hospital won't open the doors to its new, state-of-the-art acute care facility in northwest Toronto until October of this year, but the surgery department already knows the operating rooms will be running smoothly.

That's because it has pre-emptively identified possible issues with the OR block schedule, and solved them by re-designing the schedule using GE Healthcare's Hospital of the Future simulation suite for optimizing daily operations. Essentially, the hospital turned a difficult paper exercise into an automated scenario that accurately predicts patient flow. "What we have is a model that looks at the OR block schedule and predicts what our bed utilization is going to be, and what our OR utilization is going to be," said Dr. John Hagen, Chief of Surgery at Humber River Hospital. "It sounds pretty straightforward, but it's actually quite complex."

With the launch of its highly anticipated digital hospital on Wilson Ave., Humber River Hospital will close two existing acute care locations, and will convert a third into an Ambulatory Care Centre that will also have an Urgent Care Centre.

This restructuring will require the hospital to consolidate two fully operational surgery programs into one program at the new facility.

Over several months, a steering committee of surgeons, anaesthetists and administrators led by Scott Jarrett, executive vice-president, patient services, worked through many iterations of a draft OR schedule and arrived at one that seemed reasonable on paper. They then engaged GE Healthcare's simulation expertise to test it.

Dr. John Hagen

Originally developed to assist in hospital planning for new builds, the Hospital of the Future simulation suite uses different categories of data inputs to generate precise computer models of how a hospital's operations will perform as a system. It can then test the impact of changes to those inputs, based on probabilities and with a high degree of accuracy.

In the case of Humber River Hospital, the simulated model was built to look at operational capacity (operating hours and number of beds) as well as inpatient and outpatient flow, including when and where patients arrive, how they move through the system, whether they go to surgical day care following the post anaesthetic care unit (PACU), or whether they're admitted, and their expected length of stay at each stage of their encounter.

GE Healthcare also developed profiles for each surgeon, based on their OR time, and number and type of procedures performed.

"We built the model based on their historical data, validated it within the context of the schedule they had built and then merged the two surgical programs," explained Tamas Fixler, a senior consultant at GE Healthcare Partners. "We said, 'If you go with the schedule as designed, this is what you're going to see.'"

Some of the results were positive. For example, GE Healthcare was able to show with certainty that the planned 37-bed surgical day care unit and 33-bed PACU are more than adequate to handle current patient volumes with room for growth. But the model also indicated the proposed OR schedule would soon encounter issues on Wednesdays and Thursdays, leading to potential inpatient bed shortages and some cancelled surgeries.

"What we wanted to do was identify those surgeons who were really driving that peak in patient census," explained Fixler, adding that the idea was to perform a series of "strategic swaps" between surgeon blocks in order to flatten the curve.

CONTINUED ON PAGE 14

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VIEWPOINT

Mount Sinai Hospital optimizes its EHR to create an effective seniors strategy

Entire care teams can be alerted when high-risk, elderly patients are admitted to the ED.

BY ROSIE LOMBARDI

TORONTO – Older adults currently account for almost 60 percent of hospital days even though they only represent about 15 percent of the population. But most hospitals were designed in previous eras to care for younger populations.

To revamp its approach, Toronto's Mount Sinai Hospital created a new strategy in 2010 to make improvements in senior care a priority. The hospital's Acute Care for Elders (ACE) strategy saved the hospital $6.7 million alone in 2014 and has won several awards, says Dr. Samir Sinha, Mount Sinai's director of geriatrics.

The hospital has implemented an integrated system to provide comprehensive care that networks family doctors, community providers, and its House Calls program with its hospital systems to deliver the right care in the right place at the right time.

Toronto's downtown population is exploding, explains Dr. Sinha. "So we're treating 37 percent more older patients now than we did four years ago. Yet we're providing that care with fewer beds, and with a significantly shorter length of stay. We've been able tackle our elderly population's medical issues earlier, before they become really serious issues requiring more complex interventions."

At its core, the ACE strategy revolves around sharing meaningful information about their elderly patients' conditions across all care-givers inside and outside the hospital, and ensuring the right protocols are in place for treating them. "They're a small percentage of our population, but they're the majority users of our acute care hospital services. So the starting point of our strategy was to think about how we can ensure the care we're delivering is really tailored to the needs of an aging population."

To support its strategic goals, Mount Sinai modified features of its Cerner Millennium EMR system and integrated it with add-on software to evolve a new approach over the past five years.

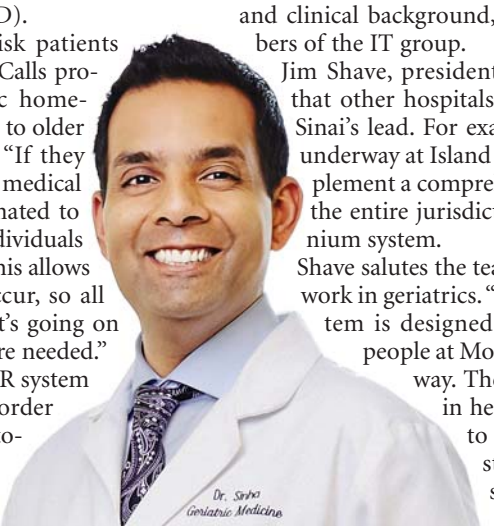
"These electronic tools have been massive enablers to help us provide better care," said Dr. Sinha. "We created a series of new models of care and interventions, but we couldn't have actually run those models efficiently if we didn't have real-time opportunities to communicate better and to share data. We were able to really take advantage of our EMR."

For example, the hospital uses Cerner's automated e-mail notification system to alert members of the ACE team inside and outside the hospital when a high-risk, older patient is admitted to the Mount Sinai emergency department (ED).

> **The creation of geriatric order sets has reduced the risk of ordering the wrong medication, giving improper doses, or providing less than ideal care.**

"We have about 500 high-risk patients who are enrolled in our House Calls program, which provides geriatric home-based primary and specialty care to older homebound patients," he said. "If they come to our ED in crisis, their medical record number is already designated to send out an alert to about 25 individuals involved in their circle of care. This allows instant case conferencing to occur, so all members know right away what's going on and what changes in their care are needed."

The hospital also used its EMR system to create a variety of geriatric order sets in 2011 to automate the protocols and procedures staff use when treating elderly patients. "That's helped us reduce the risk of ordering the wrong medication, or improper doses, or protocols that would be less ideal for the care of frail, older adults. As a result, we now provide more consistent and proactive elder-friendly care throughout the organization."



Dr. Samir Sinha, Toronto's Mount Sinai Hospital's director of geriatrics.

By integrating all these elements in its ACE strategy on top of its Cerner EMR, Mount Sinai has managed to achieve major improvements in geriatric care and has saved millions of dollars. "Within a four-year period, we reduced our lengths of stay for the elderly by 28 percent and our alternate care level stays by 20 percent. We've seen our readmission rates within 30 days decrease. The use of catheters has been reduced by over 50 percent, and our rates of pressure ulcers have decreased by 93 percent."

Dr. Sinha says a critical success factor was a tightly integrated IT team that worked in unison with the clinical team. Barbara Duffey-Rosenstein, director of clinical informatics at Mount Sinai, has both an IT and clinical background, as do several other members of the IT group.

Jim Shave, president of Cerner Canada, notes that other hospitals are now following Mount Sinai's lead. For example, there is an initiative underway at Island Health in Vancouver to implement a comprehensive ACE strategy across the entire jurisdiction using Cerner's Millennium system.

Shave salutes the team at Mount Sinai for their work in geriatrics. "They're doing what the system is designed to do, and I applaud the people at Mount Sinai for using it in that way. There are an awful lot of silos in healthcare and this is the way to connect them. People are starting to realize that they should and could be doing much better."

REBOOTING eHEALTH

Fun with Words: Don't throw out the baby with the dishwater!

BY DOMINIC COVVEY

Many years ago, after teaching a course at the University of Toronto, my students presented me with a list of things they learned from my lectures. No, it wasn't all the incredible science I taught. It was a list of malapropisms like that one, in the headline.

Apparently, a semiliterate demon was channeling through me and stating all sorts of weird things. I no longer remember all of them, but I do also remember: "That's water under the dam" and "There is a flaw in the ointment". I have no idea where these came from and can only blame the demon. Unfortunately the after-semester exorcism didn't work!

Over the years many have told me that I need to improve my listening skills. What male doesn't? I've noticed that these 'advisors' have been predominantly of the female persuasion, but I never really heard what they said. Then, about 15 years ago, I thought it might be interesting to listen, to really pay attention! So, I started listening to the actual words people use when they speak. It has been an enlightening experience, I admit! Oh, about listening and relationships, I claim to have a "wife filter", but that it is part of the corporate firewall about which I can do nothing.

I counsel you to try on the special ears I want to share with you here. Start listening carefully to what people say, both as you listen to friends and acquaintances and as you listen to television programs, even national news programs. There is an amazing ecology of feral words, phrases and sayings that are creeping into our language and slowly transmogrifying (who the heck knew that word before *Calvin and Hobbs*?) it into Future Speak.


Dominic Covvey

I thought it might be interesting and maybe fun to share some of the things I've heard on careful listening. Consider the statement: "We need to flush it out". That is certainly a valid proposal, chasing the meaning out into the open, like flushing pheasant, but the phrase is 'flesh it out', meaning to add detail or substance.

Another very common favorite is to stop "humming and hawing". I guess this kind of makes sense in that one "hums" when one does not know the words, However, the expression is hemming and hawing. Hemming refers to making the sound of a partial cough, and hawing is making a sound that expresses hesitation, like "Huh". The expression means that one is procrastinating.

The use of "perimeter" instead of "parameter", as in "These are the

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The time is right for Business Intelligence Analytics in imaging

BY JEFF VACHON

The financial crunch in healthcare – with debt-ridden provincial governments asking hospitals and other institutions to tighten their belts – is extremely challenging for diagnostic imaging providers.

They're being asked to reduce wait times and enhance clinical outcomes while cutting-back on costs. It's a tough situation.

Luckily, tools to help are at hand. The key to succeeding can be found in a new generation of business intelligence analytics (BIA) systems. Such tools have been used to great effect in other industries, and even in the general hospital environment. Now, systems have been optimized to streamline and improve Diagnostic Imaging departments.

These systems need to be vendor agnostic, and must be able to pull real-time data from RIS, PACS, EMR and voice dictation systems. The more advanced solutions deliver simple, easy to understand analysis and graphs with deep drill-downs on all aspects of the imaging operations, supported on mobile platforms for easy access.

Jeff Vachon

Currently, most DI reporting involves a retrospective analysis or "scorecard" approach that begins as a manual process in the department, with data being collected from several different applications and sources.

The reports are manually assembled in DI and delivered to the finance department, where they're transferred into a government mandated reporting system that typically presents operational information one to three months behind the imaging activity of the day.

Although they may present valuable information, their view is always looking in the rear view mirror. Scorecards do not allow administrators to effectively monitor and assess operational performance on an as-it-happens basis.

On the other hand, real-time dashboards, using up to the minute information, automate the process of data collection and enable managers to make faster, more accurate decisions, thus embedding valuable up-to-date analytics into the management process of the department After all, if decisions are made using three-month-old data, the situation on the floor of the DI department may have already changed.

Business intelligence analytics also support the drive towards implementing LEAN-based process optimization, which many departments are going through to standardize process and identify procedure times. Evaluation of the imaging process against the Canadian DI Accreditation Standards allows the breakdown and measurements of each step in the imaging process.

Analytics enables the measurement of each step in the procedure from patient registration through to examination, image read and report distribution. Evaluation of each step shown as a heat map diagram will point out if each step in the process is meeting the establish time thresholds for that type of body part and procedure. This can identify "quick win" improvement areas and the ability to monitor on a daily basis for resource and asset optimization.

The deployment of standardized, real-time measurement and reporting into the DI management process will allow for greater accuracy in the benchmarking of key performance metrics, (KPI).

This can guide operational decision-making, support the efficient management of diagnostic imaging and radiology patient workflow, and assist in clinical practice improvements such as the reduction of duplicate imaging.

Jeff Vachon is the CEO of Bialogics, a leading analytics company. He can be reached at: jvachon@bialogics.com

Smartphones and mobile tablets are becoming essential tools for clinicians

Mobile devices make it easy to check on patients, update records, and work in groups with colleagues.

BY DIANNE DANIEL

As hospitals continue to invest in mobile solutions, doctors and nurses are more likely to be texting on smartphones or swiping their fingers across tablet PCs than tapping away on desktop computers. They're relaying critical patient information, checking lab results, updating charts, or 'checking in' on patients discharged the day before.

"We're now implementing workflows which depend on mobile," said Dr. Glen Geiger, chief medical information officer at the Ottawa Hospital. "As we get deeper and deeper into this, we got the problem we wished for. Clinicians like the technology, they use the technology. Little by little it is becoming impossible to deliver care without mobile."

Dr. Geiger is referencing the fact that the Ottawa Hospital remains an Apple iPad shop. Among the first Canadian hospitals to implement a device-specific mobile strategy, Ottawa Hospital supports roughly 4,000 iPad users, updating its tablets roughly every three years. Devices belong to the individuals they are assigned to, with the exception of those who are only working at the hospital for a short period and are required to return them.

The mobile strategy is so entrenched in the hospital's workflow, with new apps coming onboard frequently, he can't imagine taking them away now. "There would be a riot if we tried to go back," he chuckles.

One of the initial goals when the hospital embarked on its journey in 2010 was to facilitate electronic ordering. Not surprisingly, physician compliance is currently hovering at about 85 percent for lab and diagnostic imaging tests, reports Dr. Geiger.

Much of that success is due to the fact that hospital-designed mobile apps function the way any iPad app would function, meaning screens scroll and pages flip in the same manner users are accustomed to. The approach minimizes user frustration and means minimal training is required, he said.

For example, the hospital is currently rolling out an electronic function to support workflow when one clinician is handing a group of patients over to another at end of shift. Because the app is modelled after an Apple app, first-time users dive right into it, even before the training session starts.

"Adopting user interfaces that take advantage of the Apple paradigm has been very successful," said Dr. Geiger. "We spent money doing it, but from a user satisfaction, user adoption point of view, we've gained a lot."

Another Ottawa Hospital mobile pilot targets the Emergency Room (ER) consultation process. When ER doctors need a consult, they enter the patient-specific information on-line and it is routed to the specialist's iPad. At the same time, a message is sent out via the paging system.

When the receiving specialist gets the page, instead of calling back to the ER ward clerk, who would then have to locate the originating ER doctor, they simply refer to their iPad where they can review all of the pertinent information immediately and can respond.

"It saves significant time for both the ER physicians and the receiving physicians because it eliminates the mechanics of the phone call," explained Dr. Geiger. "The expectation about access and communication is going up and up. That's why it's impossible to go backwards."

McGill University Health Centre (MUHC), in Montreal, is another facility looking forward with its mobile strategy. Unlike Ottawa Hospital's device-specific approach, it has adopted a Bring Your Own Device (BYOD) policy, based on delivering operating system-agnostic apps which clinicians access from their personal smartphones.

"I don't understand how anyone would want to carry two devices," said Dr. Jeffrey Barkun, professor of surgery and chief clinical officer for technological transition at MUHC.

As the hospital gets set to move to a new facility this year, where wireless access is expected to be seamless, there are more than 3,300 people using its VSign mobile software, a visual display platform developed in-house by a small team of web app programmers.

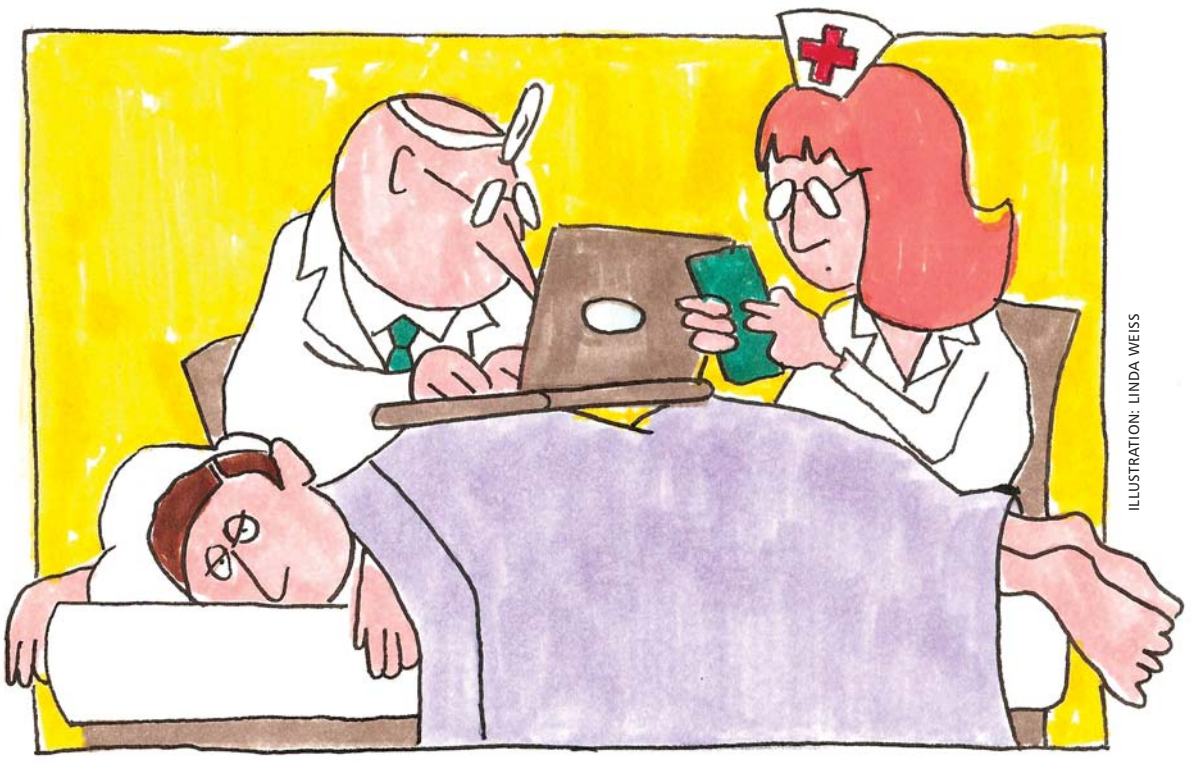

ILLUSTRATION: LINDA WEISS

VSign enables clinicians to connect from their smartphones to patient records housed in the organization's Oacis information system for quick and easy access to things like vital signs, lab results and medications.

More recently, MUHC shifted its focus to mobile communication and documentation with another in-house app called The Flow. Piloted in the pediatric intensive care unit, The Flow facilitates communication between care teams by capturing information from texts on smartphones in order to automatically populate sign-out sheets and daily notes – including Identification, Situation, Background, Assessment and Recommendation (ISBAR) information.

"Our philosophy for these apps is think small," said Dr. Barkun. "By that, we mean the app can't do everything. It has to be relatively targeted in what deliverables we want from it, and it has to be simple enough that people require no training to use it."

The Flow is so instinctive, he adds, that users gravitated towards it immediately. As part of the app, clinicians "attach" themselves to patients, creating care teams under two different categories: immediate care and consultative care. Any information they text about that patient throughout the day, similar to SMS texting but in a protected environment, is tagged and automatically applied to pre-populate both a sign-out report and a daily note.

Dr. Barkun estimates close to 80 percent of the daily note can be pre-populated using The Flow. "It's a totally intuitive extension of comments they make among each other during the day," he describes. "They're so used to messaging, they do it intuitively."

MUHC considers its BYOD strategy a more sustainable approach than trying to supply the same device to everyone. There may be limitations in functionality compared to using a larger form factor such as a tablet, but Dr. Barkun's experience is that the smartphone is the device that continues to "hit home runs."

When MUHC piloted VSign on a BlackBerry Playbook, for example, it discovered that people weren't bothering to power up a second device, nor were they careful with it. "I think a personal cell phone is just easier to manage," he said.

From a security and privacy perspective, information is protected with MUHC's BYOD strategy because nothing resides on the phone. Rather, it serves as an access device to view information stored on secure hospital servers, and a strong user authentication system requires the unique device identifier, Oacis user name and correct identification of two images, in the correct order, to approve access.

One company that is giving clinicians the option to use their preferred device – whether iOS, Android or Windows 8, smartphone or tablet – is VitalHub Corp., a Mount Sinai Hospital spin-off launched in Toronto in 2009. "We have found that many hospitals provide their nurses with mobile devices and can therefore select the platform they would prefer for those users, but physicians are generally expected to be BYOD," said VitalHub CEO Lisa Crossley. "So for a mobile solution to be practical, it has to be cross-platform."

Whereas the Ottawa Hospital and MUHC de-

velop their own mobile apps, VitalHub is designed as proprietary middleware and a set of mobile applications that sit on top of disparate clinical information systems already in place. Hospitals pay for the VitalHub Server upfront and mobile apps are provided for a monthly fee.

The initial application, VitalHub Chart, provides an easy-to-use interface to both review and enter patient data. Since then, the company has launched VitalHub Station, an electronic version of the whiteboard commonly found at nursing stations, and VitalHub Care, a community-based platform that allows clinicians to monitor complex and post-surgical patients in their homes.

The goal of VitalHub Care, stated Crossley, is to "prevent life-threatening complications and costly readmissions by allowing physicians to intervene earlier." In addition to being sent home after surgery with a list of post-care instructions and meds, patients are also equipped with a tablet PC pre-loaded with VitalHub Care, and a suite of Bluetooth-enabled monitoring devices such as a pulse oximeter, blood pressure cuff or glucose meter.

VitalHub Care prompts the patient to collect the relevant data at the appropriate time each day, and provides detailed instructions about how to use each of the monitoring devices. Once collected, data is uploaded to the patient record where physicians can access it and, if results are outside of the normal range, VitalHub Care automatically issues an alert.

Crossley states that the VitalHub user interface can be mastered by either a patient or clinician in less than five minutes. In addition to alerting physicians, the VitalHub Care solution can also be configured to email or text family members if the recovering patient forgets to collect data as scheduled.

Right now, VitalHub is working with Microsoft and Intel to implement a VitalHub Chart pilot at Seattle Children's Hospital. The company also won a request for proposal from Health Shared Services of British Columbia (HSSBC) on behalf of the B.C. Provincial Health Services Authority (PHSA) and Vancouver Coastal Health to provide a mobile clinical integration solution to more than 5,000 physicians and thousands of nurses and other health professionals.

"Rather than replacing costly and complex legacy clinical information systems, VitalHub improves their usability," said Crossley. "Mobile solutions ensure that patient information can be entered and reviewed quickly and easily, saving clinicians' time, minimizing the risk of errors, facilitating early intervention and reducing overall costs to the healthcare system."

At MUHC, Dr. Barkun also "firmly believes" that patient safety can be maximized by leveraging people's own hardware. The hospital's in-house development team of two developers and one programmer is on a mission to "make everything electronic," he said, and moving forward, he expects that to include the ability to text a symptom or diagnosis by selecting from a problem list and adding a brief 120-character message.

"The mobile system is much faster than getting information on computer, even with a single-sign on process," he said. "I never thought when we started this that in the ICU they'd be rounding on a smartphone. But the availability of results, quality of display, the graphics, is making it their rounding tool of choice."

When it comes to managing the logistics of a mobile device strategy, both the Ottawa Hospital and MUHC place smartphones and tablets in the same category as stethoscopes, paper charts, pens, and other items entering a patient room. Users are reminded to routinely clean their mobile devices using the same disinfectant wipes already widely available throughout each hospital.

One phenomenon Dr. Geiger didn't necessarily foresee is that the iPads are so popular, people are finding innovative uses for them outside of the apps provided by the hospital. Surgical residents, for example, are viewing surgical procedures on YouTube and brushing up for exams using on-line reference material.

Interestingly, when the hospital renewed its licence for an enterprise-wide reference resource in 2012, including a mobile version, utilization increased from 6,000 to 12,000 queries per week.

"We didn't plan for any of that," said Dr. Geiger. "… So when people ask me, 'Why are you paying for iPads?' Look at the utilization. Do you mean to tell me you want to take this away?"

Dominic Covvey

CONTINUED FROM PAGE 10

parameters of my assertion", is interesting. A "perimeter" is a line around something and its use gives the idea that one has bounded what one is saying. The word here should be 'parameter', meaning one of the constants or variables that determines something. Again, the evolved use still makes some sense.

A real funny one is the statement, "It's a tough road to hoe". I'm sure it would be quite tough to hoe most roads. But the word is "row", as in digging a trench in the soil. I think you can get the drift, these mistaken uses of words still bear some meaning.

Of course, almost all of us have heard someone talk about "jerry rigging" a solution. I suppose this is derogatory, a wartime word used for Germans. The proper phrase is "jury rigging". No, not as in fixing a jury in a trial! It refers to makeshift fixes or temporary thingamajigs made using available tools.

As you listen carefully you'll hear people say "That's a mute point". What they really mean is that it's a "moot" point, meaning one that is arguable. However the 'mute' adjective works pretty well too: a point that doesn't say very much.

The other day I heard someone say on television: "We have to take a new tact". Actually, that's not a bad idea, to try a new approach to things. However, the expression is "… a new tack", as in a sailboat taking a new course to take advantage of the direction of the wind.

Many people are "adverse to things". I guess that means they're facing something bad that might harm them. But, the proper saying is "… averse to something". This means that one has a strong feeling of dislike for something. Both work, though, don't they!

In our field of eHealth, quite a few people talk about 'intergrating systems' while actually meaning 'integrating systems'. But, you know, inter-grating, albeit a new word, kind of works too, doesn't it?

Oh, then there is the old problem of singulars and plurals. How many times have you read or heard it said that a person has "one criteria" (the singular is 'criterion'). Then there is that wonderful area of grammar! Consider "Me and her went to the meeting" (should be she and I, as they are subjects of the verb went).

Using participles properly is one of the greatest grammar challenges. One example of this is: "He enjoyed me singing." It's according to what you want to express, that he enjoyed me or the singing. If the latter, the statement should be "He enjoyed my singing".

Then there are dangling fragments and modifiers. Sometimes these can be quite funny, and one sees it in church bulletin bloopers, for example! "The Rev. Merriweather spoke briefly, much to the delight of the audience." Or "Wednesday the Ladies' Liturgy Group will meet. Mrs. Johnson will sing: 'Put Me in My Little Bed' accompanied by the Pastor".

The other day I heard someone say, "We have to take a new tact." Actually, that's not a bad idea, to try a new approach.

So what's the point of this article? Actually, it has absolutely no point, it's just fun! It is maybe a call for all of us to listen more carefully. It is not an incitement to the development of a critical approach. Of course, this article may be a distraction, too. But, long-live distractions! My list of like items is much longer than what is presented here. Maybe there'll be another time we can have more fun with words. We'd love to hear your examples!

I sincerely hope that I have flushed out something of value here and avoided humming and hawing. If not, I'm sure you are fustrated and the perimeters on which I based this article don't compliment your knowledge.

On the other hand, you can probably buttonhole a language expert and he or she will jerry rig an explanation for my behavior. The truth is that these ideas are farmiliar to many of you, and easy to digest. Of course, some of you are early adapters, making some points mute. I had only one criteria in writing this, that I make you laugh. For my next article, I'll surely have to take a new tact!

Dominic Covvey is President, National Institutes of Health Informatics, and an Adjunct Professor at the University of Waterloo.

Simulation technology helps prevent OR bottlenecks

CONTINUED FROM PAGE 8

GE Healthcare's simulation model identified that the bottleneck was largely due to inpatient procedures. By detecting a handful of surgeons scheduled to operate on Tuesdays and Wednesdays who had a heavy load of inpatients occupying beds, GE Healthcare was able to propose a new schedule. These surgeons and their procedures were moved earlier in the week by switching their OR time with surgeons who perform largely outpatient procedures. That eliminated the flow disruption completely by substantially reducing census variability.

Multiple scenarios were tested, and those surgeons affected had to agree to the change, but in the end their support was unanimous. When the final iteration was presented to the entire group, everyone was listening intently, Jarrett said.

"We wanted to be able to come forward to the various surgical divisions and say, 'These x number of surgeons really have the highest impact on downstream bed utilization,'" said Jarrett. "Some of the decisions we could have made with a bit of a gut feel, but then you open yourself up to criticism and you can get into some real pointed discussions. Whereas here, the data really speaks for itself."

From his vantage point as Chief of Surgery, Dr. Hagen was interested to see that elective surgeries were responsible for the crunch in the schedule. Intuitively, he always felt emergency admissions were responsible for stretching bed capacity. However, the GE Healthcare model clearly demonstrated that emergency room admissions were not the cause.

"The ironic thing is that the number of admissions through emergency rooms to inpatient beds is relatively constant," said Dr. Hagen. "What is unpredictable, and the thing that we are able to control, is the elective inpatient surgery. This modelling allows us to do that."

Humber River Hospital plans to subscribe to GE Healthcare's simulation suite as an ongoing service. The intent is to refresh the model every six months, uploading new data to reflect changes that have taken place, such as the addition of new surgeons or changes in existing surgeons' practice patterns, or shifts in certain inpatient surgeries to an outpatient basis.

Hospital staff will also be trained on how to run their own experiments using the model (e.g. to understand the system level impact of new surgeon recruitment or various operational changes) so that the OR schedule can continue to align to the hospital's needs.

"If we had just combined our present schedules, there would have been problems – no question," added Dr. Hagen. "All it meant was looking at it, analyzing it and moving a few high impact surgeons to a different day, and the whole thing smoothed out. Predictably, it will be better."

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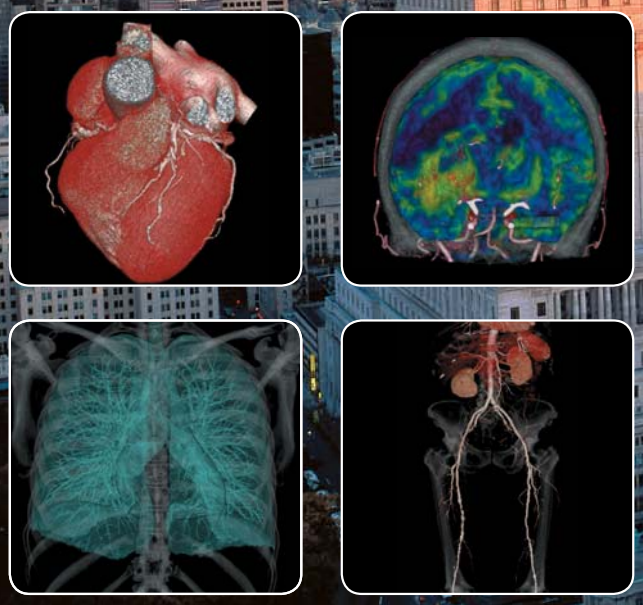

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