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# CANADIAN Healthcare Technology

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### Alberta's personal portal

After three years of development, Alberta is getting ready to launch its personal health portal. The province-wide system will give consumers access to their health records, including medication histories and lab tests.

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### Community care telehealth

Ontario's Community Care Access Centres (CCACs), with the help of the Ontario Telemedicine Network, have been running pilot tests of tele-home care systems that monitor patients in their residences. The solution is now ready for a rollout.

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### Innovative Health Links

Instead of issuing plans for improving the healthcare system from top-tier government mandarins, Ontario is experimenting with a program that lets grass roots groups come up with their own solutions.

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### Bridgepoint's human touch

Bridgepoint Health, in Toronto, has constructed a brand new hospital to provide services to complex care patients. The facility has been com-



pletely re-thought to stimulate recoveries and accentuates both high-tech and a human touch.

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## 24/7 pharmacy enhances care at community hospital

The pharmacy team at the St. Thomas Elgin General Hospital, in St. Thomas, Ont., has created a round-the-clock medication management service in conjunction with North West Telepharmacy Solutions. Always available pharmacy services are important steps in the march to implementing Computerized Provider Order Entry (CPOE), which the hospital is working toward. **SEE STORY ON PAGE 6.**

## Titan Medical readies cutting-edge surgical robot

BY JERRY ZEIDENBERG

**T**ORONTO – Titan Medical, a Canadian company, is on the verge of leapfrogging the competition in the \$4 billion marketplace for surgical robotics. Titan's managers say they're just two years away from releasing a robotic system that requires only one incision in the patient, in contrast to the three or four

incisions required by other surgical robots.

"We're starting tissue and cadaver studies later this year," said John Hargrove, CEO of Titan Medical. "The plan is to commercialize and start marketing the system in 2015, in Europe and the United States." Those are the world's biggest markets for surgical robots, but the company also plans to make the system available in Canada.

The innovative robot, known as SPORT

(Single Port/Orifice Robotic Technology), will benefit patients as it is less invasive than cutting several openings. A single incision will result in reduced pain and blood loss for patients, and it also lowers the risk of infection.

The system consists of a workstation for the surgeon and the actual robot, which is positioned beside the patient. Together, they

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**PHILIPS**

sense and simplicity

# Titan Medical's cutting-edge surgical robot said to be two years away

CONTINUED FROM PAGE 1

take up less space than today's surgical robots and will also be far less expensive.

The current leader in surgical robotics is Intuitive Surgical, of Sunnyvale, Calif., which has sold about 15 of its Da Vinci systems in Canada and some 1,500 in the United States. "Intuitive is the elephant in the room," said Hargrove about the company Titan is taking aim at.

A system from Intuitive costs about \$2 million, while a SPORT system from Titan will list for about half of that. That kind of price tag will make surgical robotics much more affordable for most hospitals.

Another advantage: Titan's system can be moved around in hospitals, from one operating suite to another, while Intuitive's larger Da Vinci footprint normally remains where it has been set up – even if it isn't being used during an operation.

Creating a new surgical robotic system doesn't come cheap – Titan Medical has invested about \$35 million in the project. But in doing so, it has created innovations that may be game-changers in this field.

The single-port system is a key innova-

tion. Once Titan's robotic arm is inserted through a 25 mm incision, three arms emerge from the instrument – two for clasping and cutting, and one with a 3D camera system. The ultra-slim arms resemble metallic snakes, and amount to a technological breakthrough in their own right, as they're strong, flexible, and accurate.

"We're creating a system with unprecedented dexterity," said Dr. Reiza Rayman, president of Titan Medical and a former assistant professor of surgery at the University of Western Ontario. Dr. Rayman is a world leader in robotics – in 1999, he conducted the first beating heart robotic bypass surgery.

Dr. Rayman noted that the snakelike arms are only 5 mm wide, but are capable of lifting a pound. What's more, they offer the surgeon 'seven degrees of freedom', which is important, because you want the instruments to offer as much flexibility as the human arm, elbow and hand. "It enables precise dissection," commented Dr. Rayman.

(The seven degrees of freedom refer to



The Titan team has devised a new form of robotic arms that are lithe, agile and strong.

up and down movements, right-left, triangulation, as well as pitch, yaw, roll, and opening and closing of the instruments.)

The robotic arm technologies were acquired by licence from Columbia University in New York. Just recently, Dr. Dennis Fowler, director of the Center for Innovation and Outcomes Research in the Department of Surgery, Columbia University, joined Titan Medical, becoming its director of clinical affairs. Dr. Fowler is the co-inventor of the single-port Insertable Robotic Effector Platform – the snake-like arms used by Titan's robot.

Another remarkable technology is the

vision system that's under development by Titan. It positions two tiny cameras and lenses at the top of the third arm used in surgery, thereby creating three-dimensional images and giving surgeons highly accurate views of the operating site. "It's a chip on the tip," said Dr. Rayman.

Right now, Titan has produced a working prototype of the SPORT robot. Once it's ready for marketing, the company plans to target two main areas, general surgery (specifically gall bladder and appendix operations) and ears, nose and throat (ENT). Currently, surgical robots are used primarily in hysterectomies and prostatectomies.

Now that the base technologies have been devised, further refinements are being produced by Titan's commercialization partner, Ximedica of Providence, R.I. "There's no shortage of hospitals willing to assist us," said Dr. Rayman.

In addition to helping with technological and clinical development of the SPORT system, hospitals and surgeons worldwide would like to see new competitors and alternatives arrive in the field of medical robotics. "They really do want more choice, and they'd like to see more competition," said Hargrove.

That's good news for Titan Medical, which will have a solution ready for them in two years, if all goes well. "We'd like every hospital to say they're a SPORTs fan," quipped Hargrove.

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## GE Healthcare rolls out cloud imaging, SimSuite

GE Healthcare has introduced two new advanced products: GE's Cloud Imaging solution and Hospital of the Future SimSuite. The cloud platform provides secure and reliable access to a suite of imaging applications through the internet. It addresses the total cost of ownership challenges with traditional on-premise IT systems through a new consumption-based business model.

GE Healthcare's Hospital of the Future SimSuite makes it easy to quickly test alternatives to make care delivery more efficient. This helps providers improve efficiency in a variety of ways: to design more efficient facilities to reduce nurse travel time, to re-design care delivery models in units and departments to increase clinician time at the bedside and decrease cost per patient day, and to reduce delays.

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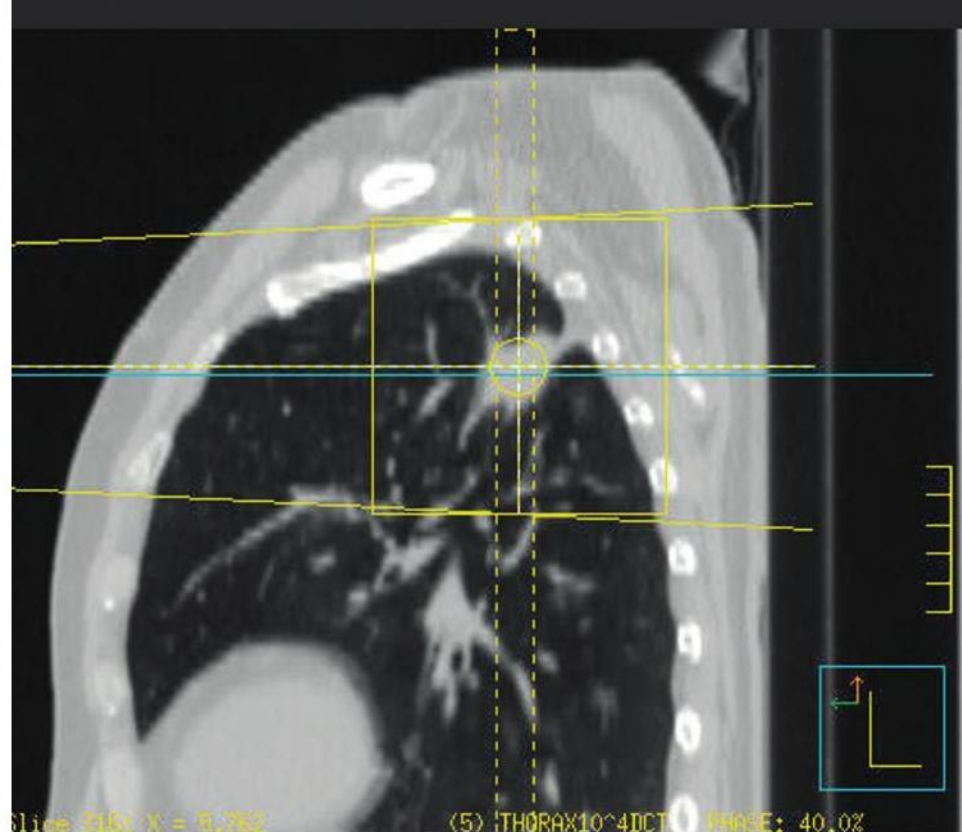
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# Alberta Netcare system is preparing rollout of personal health portal

BY JERRY ZEIDENBERG

Alberta is investing in technology to give patients improved access to their health information and to offer medical professionals better tools when providing primary healthcare services.

Consumer-directed care is high on the agenda of Alberta policy makers, and a Personal Health Record (PHR) has been developed as a portal in the provincial Alberta Netcare system.

"Increasingly, patients must take more responsibility for their health," said Susan Anderson, assistant deputy minister and CIO with the health information technology and systems division at Alberta Health. "They've got five minutes in their doctors' offices, and then they have trouble remembering what went on." A personal health record can go a long way in helping.

For example, medication lists in the personal health record can provide additional information, such as contraindications. And lab information can provide context and meaning to the data; it can also flag abnormal test results.

The personal health portal has been in development for the past three years, and the province is using Microsoft's Health-

Vault as the basis of the system. (In Canada, Telus offers HealthVault under its own branding as Telus health space.) Canada Health Infoway has been an active partner in the creation of Alberta's personal health portal.

"We're currently working on some issues with the privacy commissioner, but we believe that within the next year we should have a launch," said Anderson.

The personal health record will be able to pull medication information from the provincial drug information repository, along with lab reports, giving patients extensive access to their medication histories and test results.

But the system will also have strong auditing abilities. "It will enable you to see who has accessed your content," said Anderson. "That's especially important if you share access to the record with family, friends and caregivers."

Along with the rollout of the personal health portal, Alberta Health Services plans to launch an educational campaign. "We want to inform the public about what the portal is, what their rights are and what their obligation is," said Anderson. "After all, we've never asked people to maintain their own records before."

She emphasizes that education will be

important, as people treat information and privacy issues in different ways. "People under the age of 30 have a different idea of privacy – many of them post everything on Facebook."

These individuals may need instruction on the dangers of sharing too much information, while others may want to know more about the benefits of enabling family, friends and care-teams to access their records.

Anderson emphasizes that each individual will be in charge of his or her own record. He or she will be able to provide others with permission to view the record, and in that way will be able to build more informed support teams.

Still, there will be context and explanations offered that allow patients to take better care of themselves. "We want patients to have enough information to self-manage their conditions and to be part of the care team," said

Susan Anderson,  
Alberta Health



Anderson. "We have to recognize that patients are part of the care team, too."

Alberta Netcare is a secure and confidential record of data collected from health facilities across the province and used by healthcare professionals to provide accurate, complete and timely health services to Albertans. The system is a well-established EHR with more than 40,000 users including over 5,000 physicians serving almost 4 million Albertans. The EHR, with foundational software developed by eHealth company Orion Health, has been implemented to improve patient safety, increase the efficiency of the healthcare system, facilitate team-based care and improve patient outcomes.

"The Alberta Netcare EHR has been viewed as a tremendous success within Canada and internationally," said Gary Folker, senior vice president, Orion Health Canada. "The EHR Portal provides up-to-date patient information at the point of care, supporting better care decisions and laying the groundwork for increased patient involvement."

## Delivered through CCACs, telehomecare services keep patients healthier

TORONTO – A variety of new technologies are now empowering chronic disease patients to better manage their conditions while at home.

Telehomecare is a magnificent example of technological innovation that's being used to provide better care.

Under the guidance of Ontario's Community Care Access Centres (CCAC), telehomecare has been deployed as a self-management program that provides heart failure or chronic obstructive pulmonary disease (COPD) patients with weekly health coaching and daily monitoring of vital signs in their own homes. A patient is on the program for six months, on average, and the goal is to help them to achieve the best possible quality of life through learning to manage their conditions.

Registered nurses trained in telehomecare use simple home-based technology to monitor key health indicators and provide health education and coaching. This can include discussing the symptoms of a patient's condition and how the patient can manage his or her own diet, exercise and other factors for optimal health.

Telehomecare is supported by the Ontario Telemedicine Network (OTN), which provides the technology and trains Registered Nurses in chronic disease self-management, as well as best practices in COPD and heart failure.

At present, two CCACs deliver telehomecare. North East CCAC delivers telehomecare on behalf of the North East Central Local Health Integration

Network (LHIN), and Toronto Central CCAC delivers it on behalf of the Toronto Central LHIN. The program complements the CCAC's objective of helping patients stay at home as long as possible, and takes advantage of a technology platform to ensure that nurses have access to up-to-date information about the patients in their care.

Telehomecare is also currently available in the Central West LHIN, where it is delivered by the William Osler Health System. The program is set to expand gradually through LHINs across Ontario, beginning with the North West LHIN, where it will be delivered by the North West CCAC, and Central LHIN, where it will be delivered by Southlake Regional Health Centre.

The most important partner in the healthcare system is the patient. By engaging patients as partners in their care plans, right in their own homes, telehomecare helps them better manage their conditions and take control of their own lives. This in turn reduces the costs of chronic disease management, and in so doing, provides a benefit to the overall healthcare system in Ontario.

Currently, 800 patients are enrolled in telehomecare. They are being cared for by 16 telehomecare nurses over North East, Toronto Central and Central West LHINs.

The pilot project for telehomecare in 2007 found that:

- Monitoring patients in their own homes with the support of a nurse coach resulted in a 73 percent reduction in emergency room visits.

- Hospital admissions were reduced by 65 percent.
- Walk-in clinic visits were reduced by 96 percent.

**Local impact:** Jenny, who has chronic heart failure and a pacemaker, takes part in the telehomecare program offered through Toronto Central CCAC. The program follows people with chronic heart failure and chronic obstructive pulmonary disease for six months, monitoring their vital signs daily and providing weekly health self-management coaching sessions each week.

Jenny at first had hesitation about using the equipment. "I didn't even have a

computer in my home," Jenny says. But with some guidance, Jenny has become adept at checking her blood pressure, weight, heart rate and pulse.

**The program is set to expand gradually through Ontario, starting with the North West LHIN and Central LHIN.**

computer in my home," Jenny says. But with some guidance, Jenny has become adept at checking her blood pressure, weight, heart rate and pulse.

Next, using a touch-screen tablet, she answers a few simple questions, such as, "Are you more tired today than yesterday? Are you short of breath today? Do you have any pain?" Jenny's daily results go directly to her telehomecare nurse, Linda. An alert automatically draws Linda's attention to anything outside of Jenny's normal range.

One day, Linda noticed Jenny's heart rate was lower than her normal range, but her blood pressure was normal. "I de-

decided to follow the trend," Linda recalls. By the second week, Linda says, "I could hear how short of breath Jenny was on the phone." She advised Linda to go see her family doctor. Linda sent Jenny's information directly to the doctor. After examining Jenny, the doctor adjusted her blood pressure medication.

But back at home, Jenny felt no better. "She was really tired, couldn't go for her walks. She was worried." Linda now called Jenny's cardiologist at the pacemaker clinic and arranged for an appointment. At the clinic, the cardiologist reviewed her symptoms and increased her pacemaker rate.

The effect was almost immediate. "I felt like someone had lifted something off me," Jenny reports.

**Benefits of Telehomecare:**

- Empowers patients to take control of their own health and life by teaching them how to better manage their conditions at home, preventing exacerbations of their illnesses. It also reduces the need for tertiary care services.

- Telehomecare brings healthcare to a patient's home with special equipment that helps to monitor their condition and remotely connects them to Registered Nurses. If something goes wrong, the nurse can take quick action.

- Improves and enables equal access to care, especially for those living in remote areas.

- Improves patient self-management, medication compliance, clinical outcomes, patient and provider satisfaction, best practice care for chronic disease, data integration.



## 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.

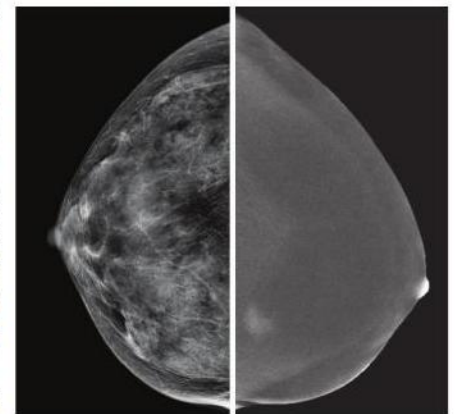
Launched in 2010, SenoBright is already in use at numerous major mammography centres in the United States, France, Spain, Italy, Belgium, Germany, Austria, and Japan. SenoBright uses X-rays at multiple energies to create two separate but almost simultaneous exposures.

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.



# Telepharmacy helps Ontario community hospital provide 24/7 service

BY SAMMU DHALIWALL  
AND JEFF THOMPSON

ST THOMAS ELGIN GENERAL HOSPITAL (STEGH), a 166-bed community hospital located in southwestern Ontario, provides comprehensive 24-hour coverage in internal medicine, surgery, obstetrics, pediatrics, anesthesia, emergency and family medicine.

To support this level of care, the hospital implemented a 24/7 hospital pharmacy service in early 2013. The pharmacy service now supports comprehensive medication care that includes unit dose packaging, automatic dispensing cabinets and the support of a clinical pharmacist around the clock.

A STEGH team is in the planning stage for implementation of a computerized physician order entry (CPOE) system within the scope of the regional HUGO project.

The HUGO (Healthcare Undergoing Optimization) project involves 10 hospitals across southern Ontario adopting advanced technologies to shift from paper to electronic processes, including computerized physician order entry for tests and prescribing medications.

An electronic bedside bar-coding system will also be used to ensure that the right patient is receiving the right medication at the right time. The 24/7 pharmacy service capabilities will support the vari-

ous medication safety standards that are part of the HUGO project.

At press time, STEGH was scheduled to go live with CPOE in January 2014 along with four other local hospitals.

Dr Nancy Whitmore, vice president of medical affairs and the chief of staff at STEGH, was instrumental in working with the physicians and surgeon group at STEGH to plan for the CPOE system. "Our medical staff are ready to go," said Dr. Whitmore. "They all see how CPOE will continue to improve our clinical services at STEGH."

For its part, the pharmacy leadership team at STEGH wanted to ensure that a well-established 24/7 pharmacy service was in place for the go-live date.

"With the assistance of telepharmacist services, we are now in a position to be ready for the next steps of CPOE," said Anita Grant, former manager of pharmacy services. "We have developed standard operating procedures and we've scheduled staff to perform many of the manufacturing duties during the night shift, which allows us to be an onsite, 24/7 service."

Many Canadian hospitals are assessing the feasibility of moving to a 24/7 pharmacy service model. Hospitals have hesitated due to the perceived increase cost to provide such a service.

However, as pharmacy services are required around the clock, there is an oppor-

tunity to refine the staffing model to distribute staff and pharmacy activity throughout a 24 hour day.

At STEGH, pharmacy assistants perform order entry, medication packaging, dispensing, and delivery responsibilities around the clock and address any automated dispensing cabinet issues. The pharmacists perform the cognitive review of the patient medication profile to identify potential errors, omissions, or dangerous

**Many Canadian hospitals are assessing the feasibility of moving to a 24/7 pharmacy service model.**

drug-drug interactions.

STEGH's previous pharmacy staffing model utilized the services of North West Telepharmacy Solutions (NTS), the leading telepharmacist provider of remote clinical pharmacist services across Canada. The NTS pharmacists supported the onsite pharmacists during business hours performing the physician order review process.

In 2013, STEGH adjusted the telepharmacist coverage so that NTS pharmacists remotely assisted in the support of a 24/7 model for physician order review and timely patient medication access.

During the day (8 am – 4 pm), NTS

pharmacists remotely review physician orders, allowing the on-site hospital pharmacists to address pharmaceutical issues. After 4 pm and overnight until 8 am, NTS pharmacists are providing both physician order review and clinical coverage remotely, including an on-call service, allowing nurses and physicians to access a pharmacist after hours.

Kevin McDonald, senior manager at NTS, said the growth of telepharmacy services over the next several years will be driven by the 2014 Accreditation Canada Standard, which requires a hospital pharmacist to be available 24 hours a day.

This is a logical time for hospitals to look at expanding their hours of pharmacy operation with their own resources or considering the use of North West Telepharmacy Solutions.

"The nice thing about utilizing NTS for overnight coverage is that hospitals only need to pay for the coverage necessary for that site," said McDonald. "We can offer a realistic and affordable solution to any hospital of any size."

*Sammu Dhaliwall, PharmD, is Business Development Manager with North West Telepharmacy Solutions. Jeff Thompson, BSc, MBA, is the Hospital Pharmacy Operations Specialist at North West. For more information please visit <http://www.northwesttelepharmacy.ca>*



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# How to implement Big Data Analytics: With a little help from Infoway

White Paper provides a well-written and clear background to Big Data Analytics.

BY RICHARD IRVING, PHD

Canada Health Infoway recently released a white paper on Big Data Analytics (BDA) in healthcare. It is available for download at <https://www.infoway-inforoute.ca/index.php/resources/technical-documents/emerging-technology>. If you are interested in this rapidly developing area, I strongly recommend that you download and read the report. It provides a well-written and clear background to Big Data and Analytics, together with recommendations on how to proceed to adopt these technologies. Rather than rehash what is explained in the report, I will focus on the challenges and recommendations contained in it.

The CHI report identifies six challenges in the introduction of BDA. These are Governance, Funding Models, Business Model, Data Custodianship, Skilled Resources, and finally Privacy and Security.

In previous columns, I have advocated for a Data Governance Plan which would include the overall governance of data management processes, compliance with legislation along with data custodianship, and privacy and security in one comprehensive plan. The advantage of combining these challenges into one plan is that it forces the organization to integrate the management of the whole process of data acquisition, analysis, security, use, storage and eventual disposal into one comprehensive process.

This minimizes the chance that some key element will be overlooked. An integrated data governance

plan is only meaningful in a broader context of the organization's business model which includes the funding model.

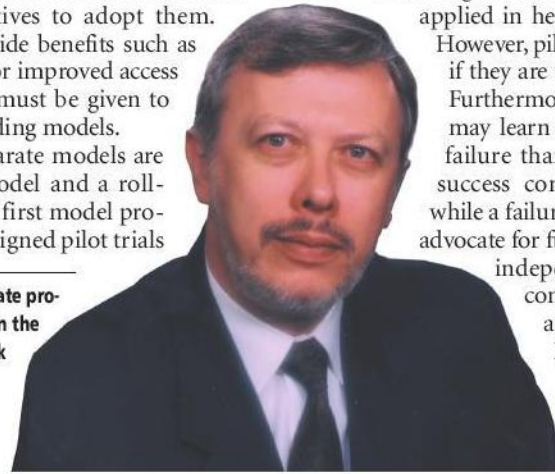
Funding models largely drive investment in healthcare. In the last two years I have become aware of three innovations that would improve access to healthcare,

**Canada Health Infoway recommends the creation of pilot projects and partnerships with public and private-sector organizations.**

but which languish because healthcare institutions have no financial incentives to adopt them. Clearly, if BDA is to provide benefits such as improved quality of care or improved access to care, serious thought must be given to appropriate incentive funding models.

I suggest that two separate models are required, a pilot trial model and a rollout/adoption model. The first model provides funding for well-designed pilot trials

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 [riving@schulich.yorku.ca](mailto:riving@schulich.yorku.ca).



of BDA in key areas such as clinical decision support, clinical operations, etc. The second provides financial incentives to adopt BDA technologies that are proven to either reduce costs or improve quality (or ideally both).

Another aspect to investments in BDA involves the metrics used to measure success. (CHI refers to them as a business model.) Early in the development and adoption of any new technology, it is difficult to develop realistic metrics since we don't really know what benefits, if any, will accrue to the organization. However, this should not be a deterrent to thoughtful experimentation.

The CHI recommendation, to develop pilot projects and partner with appropriate public and private sector organizations to learn how BDA can be

applied in healthcare, is excellent advice.

However, pilot studies only provide value if they are well designed and evaluated.

Furthermore, some will fail. In fact, we may learn more from a well-designed failure than from a success because a success confirms our preconceptions while a failure challenges them. I strongly advocate for funding for an integrated, but

independent external evaluation component as a key element in any pilot proposal.

If you have thoughts or comments on this article please send them to me at [riving@schulich.yorku.ca](mailto:riving@schulich.yorku.ca).

## Practical advice for getting started with Big Data Analytics

BY DEREK RITZ, P.ENG., CPHIMS-CA

It is important to differentiate between Big Data and Big Data Analytics. Big Data refers to data sets that exhibit the "3Vs": high volume, high velocity and high variability. Big Data Analytics, however, are computational techniques. In contrast with common BI techniques, Big Data Analytics are from the family of inductive statistics. These inductive techniques are focused on determining what underlying patterns or relationships may be derived from the data itself, without pre-supposing what those patterns might be.

Here is a key point, and a noteworthy hype alert: inductive techniques may be employed with any representational data set that is large enough to be statistically valid. An organization doesn't need to be sitting on the sum total of the western world's web traffic to begin employing Big Data Analytics to generate useful insights. In fact, a recent MIT Sloan Management Review article noted that the "adoption barriers that organizations face most are

managerial and cultural rather than related to data and technology." (For references, see the online version of this article at: [www.canhealth.com](http://www.canhealth.com))

The MIT article provides a recommendation regarding how to get started with a successful Big Data Analytics project: pick something important. Executive attention span is the main obstacle, and you will only sustain management interest if you are undertaking an analysis that matters to the organization.

Because of the nature of Big Data Analytics, another key to getting started is to frame the questions before worrying about the data. This may seem counterintuitive, but such a focus helps avoid an over-emphasis on collating and cleaning and coding comprehensive data sets when only a subset of these might apply to the questions at hand.

What kinds of topics lend themselves to Big Data Analytics? There are many, of course, but some of the most interesting questions are those which are difficult to address by conventional means. For example, it is well known that the social determi-

nants of health have a significant impact on health status and on the efficacy of health interventions.

Once an organization has its arms around what questions should be the subject of analysis, the key question is: how? Here is the good news: inductive



Derek Ritz

techniques will work against any statistically valid, relevant data set. This means that a sample of a larger dataset – some "small data" – could be employed to test particular techniques

using tools you already have, such as a spreadsheet or database program. The Data Analysis Toolpak and Open-Solver add-ins for Excel, for example, are very useful for doing such experimentation.

Whatever the analysis technique, it is important for the resulting insights to be presented in such a way as to be actionable. This is where vi-

sualization tools are important. Some tools worth looking into include:

- BigML ([www.bigML.com](http://www.bigML.com)) – an analysis and visualization tool for doing association rule learning.
- Google Fusion Tables (<http://www.google.com/drive/apps.html#fusiontables>) – a beta-ware toolset which can be used to generate maps, charts or timelines.
- Many Eyes (<http://www-958.ibm.com/software/analytics/maneyes/>) – a freeware service operated by IBM which offers a wide range of innovative visualization tools.
- Statwing ([www.statwing.com/](http://www.statwing.com/)) – an interactive tool which may be used to "slice and dice and visualize".

Once core competencies in Big Data Analytics have been developed, for example, organizations should consider setting up analytics units devoted to leveraging the techniques across the enterprise.

*Derek Ritz is an advisor to public and private sector clients, in Canada and internationally, regarding eHealth strategy, architecture, implementation and adoption.*



# Ethics, schmethics and attitudes, platitudes – the conscience gap

BY DOMINIC COVVEY

Some eHealth leaders have done the 'Perp Walk', paraded off highly visibly, and some have even been convicted of a crime. Others have executed more stealthy exits from the eHealth arena.

We all know that if you don't know you have a problem, you can't fix it. Could it be that personal issues inhibit the advancement of eHealth? Should we be rebooting ourselves (maybe before we're 'booted')? My points here are based on the subtext of a number of messages I've received about this column.

All of us have been aware throughout our careers of how technology can stymie our efforts. Early on,



Dominic Covvey

hardware was inadequate, then communications technology was an impediment. Today, to some degree, we are still beset by software issues. Some of this is due to our failure as an industry to adopt, for example, new software architectures

and other software engineering advances that have been around for a decade or more. So, things are not ideal yet in the technological domain, but they are not things that stop us entirely or even stall us much from progressing.

We have seen a narrowing of the technology gap. Today, we seem to be up against another gap: the human gap. Many have published highly influential articles regarding issues like adoption, indicating that we are not really addressing people's abilities to absorb technology, integrate it into their work, and use it meaningfully.

Some articles do imply that a high percentage of physicians use EMR systems for recordkeeping and care management tools, but fail to recognize that many physicians just use their systems for mundane tasks like booking and billing.

Others have written about our failure to understand that technology can have, in addition to its desired effects, untoward impacts. For example, a medication system can contribute to medication errors through a slip of the mouse or finger in selecting an item in a pulldown list. Of course, there is also the issue that little of what we do in eHealth has been demonstrated to actually improve efficiency or to enhance patient care.

These are important human issues because they undermine our claims of the value of eHealth and frustrate people who acquire systems at great expense and try to use them.

But there is another gap. I'll call this the 'Conscience Gap', because it goes deeper into who we are. Despite the fact that we all know that we must be fully competent in order to serve as professionals, few of us have allowed ourselves to be assessed as to the comprehensiveness of our knowledge, as to our ability to execute important skills like training or managing innovative projects, and as to having adequate experience to fill specific roles.

This is the part of the Conscience Gap known as the 'Competency Gap'. A professional in eHealth must have the (demonstrable) knowledge, skills and experience necessary to function and excel in his or her eHealth role. However, the reason I've called this the 'Conscience Gap' is that, in

addition to these three basic competencies, there is the issue of attitudes and the guidance for those attitudes typically embodied in a Code of Ethical Behavior.

I've written about attitudes before. Attitudes apply to different people because attitudes encompass the way we think and

feel about something or somebody and the way we behave towards them. In fact, we need to have appropriate attitudes towards different groups of stakeholders. Stakeholders include myself and my family, other people with whom I work or whom I

CONTINUED ON PAGE 14

## Learn How Canadian Hospitals are Streamlining Access to Patient Data



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# Ontario's Health Links: Grass roots movement on track to transform healthcare

Instead of government mandarins invoking new programs, local groups are devising their own solutions.

BY DIANNE DANIEL

One year after the Ontario Ministry of Health and Long-Term Care (MoHLTC) announced Health Links – a program aimed specifically at delivering co-ordinated care to patients with complex needs – 26 projects are fully approved and starting to work, with another dozen expected to be operational before the end of 2013.

The program is based on a new approach to collaboration that brings together local healthcare providers, community services, hospitals, specialists, additional support groups, as well as family members to address high users – patients who account for only 5 percent of Ontario's population but consume two-thirds of available health dollars.

"There's something about this that has captured the imagination of the provider community," says Helen Angus, associate deputy minister, MoHLTC Transformation Secretariat. "We find they are stepping up pretty quickly to be a part of Health Links."

That something isn't necessarily a fancy new technology platform. Nor is it a structured set of pre-conceived regulations and governance to follow. What makes Health Links innovative is that this time, the province is counting on complexity science to be the agent of change, replacing the rule book with "elbow room to innovate," says Angus.

"We didn't have to sell this to the sector," she said. "It was their idea in the first place and we managed to find a way to make it happen."

Simply put, complexity science recognizes that complex systems like healthcare are unpredictable by nature and therefore need freedom to problem-solve in a more dynamic and creative way.

Applied to the Ontario Health Links program, it means that no two Health Links projects will necessarily look alike or operate in the same way, yet they all share a collective goal: to improve patient well-being and reduce costs by ensuring the medical, functional and social needs of complex patients are met.

Joining or establishing a Health Link project is voluntary. To get off the ground, a Health Link must first complete a readiness assessment that demonstrates the willingness of its various participants to work together. From there, each individual Health Link is free to move forward in a way that makes sense for its community.

Health links are currently under way in the following Ontario LHINs: Toronto Central, Central, Central East, Central West, Erie St. Clair, Hamilton-Niagara-Haldimand-Brant, Mississauga Halton, North East, North Simcoe Muskoka, South East, South West and Waterloo Wellington.

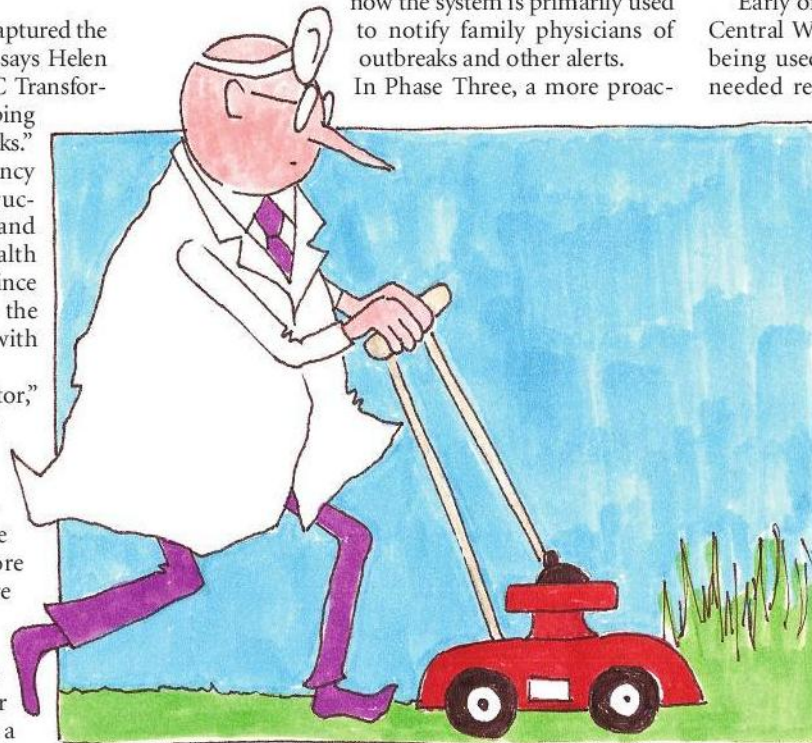
The South East Local Health Integration Network (LHIN) has seven Health Links under development, each with its own vision statement. Dr. Jonathan Kerr, a family physician in Belleville, Ont., and South East Primary Care LHIN lead, is helping to establish the various links. He likens the process to creating art.

"The ministry has given the Health Links the canvas, the brushes, the paint, and then said paint what makes sense. They haven't said paint clouds, trees

and some grassy knolls. The Health Links are able to paint what they think is best, but they have to produce a painting," he explains.

Each of the South East Health Links has received \$600,000 in initial funding to get up and running. As they move forward with identifying high-use patients and designing co-ordinated care plans to better treat them, they are also working together on a common IT strategy.

Phase one is what Dr. Kerr refers to as the 'low-tech' IT solution. Each link will use existing electronic medical records to identify high-use patients at the primary caregiver level, based on simple criteria such as number of emergency room visits or hospital admissions in the previous year. Phase Two will leverage an existing Ontario Public Health surveillance system to flag high use patients based on similar criteria. Right now the system is primarily used to notify family physicians of outbreaks and other alerts. In Phase Three, a more proac-



tive approach will apply specific demographics to identify potential high-use patients so that preventative measures can be put in place to keep them healthy. And in Phase Four, the Health Links plan to work with Queen's University students to develop predictive computer models for more rigorous identification of at-risk patients.

"One of the failings of healthcare planning is that they build a better mouse trap, implement it and then evaluate it a year later," says Dr. Kerr. "Let's say we identify 10 patients. We're going to sit down with them, develop a co-ordinated care plan for those 10 patients, and then pause and say what worked, what didn't, what do we need to improve in the process? We're going to have iterative cycles of learning, testing, learning and I think part of that will be learning about what IT solutions are needed," he explains.

A similar approach is under way in the Central West LHIN where five Health Links are united by a common steering committee and have agreed to share an IT platform despite their individual differences. It's too soon to tell what that platform might entail, but Matt Anderson, president and CEO of William Osler Health System, which is serving as the

administrative lead for two of the five links, says it makes sense to unite on the technology front.

"Across Ontario, in many jurisdictions, we've gotten ourselves into trouble by leaping a little bit too quickly into the IT solution," says Anderson, noting that the LHIN's Health Links are starting off by focusing on changes to care delivery first.

"That is by far the smarter way to go. Then, as you learn what exactly you need from an information exchange perspective to support those people, then you can start to introduce technology."

The Health Links have yet to decide on a technology platform, but Anderson is confident it will be shared. For now, they are relying on Excel spreadsheets and other reporting tools to identify complex patients. Though low-tech, it's already proving beneficial.

Early on in the process, for example, some of the Central West Health Links discovered the algorithm being used to identify their high user populations needed refining because many of the patients selected were palliative and those with other illnesses and circumstances were being overlooked. They're also taking baby steps in order to better understand their high user population and why patients are struggling with their care plans in the first place.

"This is not some grandiose, multi-year, big dot change kind of process that becomes esoteric," notes Anderson. "This is about their patients getting additional services that likely already exist in the community and because it's that grass roots, you can touch it, feel it. We're talking about a person as compared to statistics."

Under a Health Link model, patients no longer need to answer the same question from different providers. Instead, they will have an individualized, comprehensive care plan to follow and designated care providers to call. To demonstrate the expected benefit of the Health Links program when treating high-need patients, MoHLTC uses the example of a senior living independently at home and receiving weekly visits from her local Community Care Access Centre (CCAC). One day she falls and gashes her arm. With no Health Link in place, she calls 9-1-1, is taken by ambulance to hospital for treatment and returns home. Her family doctor isn't notified and she doesn't receive follow up care. Her personal support worker is surprised to discover the injury on the next visit.

With a co-ordinated care plan in place, she notifies Emergency Medical Services and her wound is treated at home. EMS contacts her primary caregiver who makes a geriatric assessment referral on the spot and her children later accompany her to the appointment to learn how they can improve her functional ability. The patient also enrolls in a falls prevention program.

The possible breadth of reach is another reason many are calling Health Links innovative. In a statement, Dr. Scott Wooder, president of the Ontario Medical Association, calls the program "a real opportunity to improve the quality of care and efficiency of Ontario's healthcare system" and goes on to state that the OMA believes "the initiative will encourage providers across and between sectors to consider en-

hancing connectivity through the EMR (electronic medical record)."

As Health Links roll out across the province, the OMA is taking a facilitative role, equipping physicians and providers with the information they need to be key contributors to establishing local Health Links.

Maggie Keresteci, senior director, OMA Health System Programs, is encouraged by the fact the ministry is giving primary care room to apply the concept of a Health Link in a manner they deem best for their respective local environments.

"One of the reasons that this is innovative is that it really is a bottom up, grass roots initiative," she says. "It's taking system transformation and recognizing that it happens from the bottom up, even if the concepts are developed at a ministry level."

In addition to traditional partners such as hospitals, primary care, CCAC and specialists, several Health Links are also incorporating EMS, pharmacy, and other community supports, including mental health services, food services, and social services. The co-ordinated approach means the partners aren't only looking at the medical model, but are considering social determinants of health as well. It also means a Health Link in a rural setting can look very different from a Health Link in an urban setting.

One approach being considered by several Health Links is to create a system navigator role. Once high-need patients are identified, a system navigator meets with them and their family members to determine the issues that matter most.

For example, a diabetes patient may be flagged as a high-need user of the system for reasons other than their diabetes. Perhaps they have a very effective care program in place to manage the diabetes, but are battling poverty and unemployment. A co-ordinated care plan will be based on addressing the most pressing need and improving quality of life; the system navigator will ensure the patient is connected to the relevant supports.

"It really embraces complexity science where it's not a linear approach, you stop thinking about direct cause and effect in a binary way and you start thinking about the complex systems as whole," says Keresteci. "That leads to the kind of thinking where you say it's not because x caused y,

it's because of the whole situation. That in itself is extremely innovative."

"What's interesting about Health Links is even from the get-go we were interested in organizing care around the person," adds MoHLTC's Angus. "Complex patients come with a range of needs and some are well beyond what the health care sector provides. We're seeing a lot of engagement within the community, which I think is terrific."

As Health Links continue to take shape across the province, more funding is expected. Over time, as IT platforms are more firmly established and communication strategies take hold, ongoing costs will most likely be absorbed by the participants.

Meanwhile, the low-tech, ground-level movement is capitalizing on EMR implementations and other communication

links already in place. The South East LHIN Health Links, for example, are using an existing hospital report manager to notify family physicians whenever a patient is discharged from hospital.

Simply reconciling medication at discharge and ensuring high need patients are seen by their family doctor within seven days is proven to reduce risk of hospital readmission.

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**Ontario Health Links at a Glance**

- A Health Link may include family doctors, specialists, hospitals, home care, long-term care and community support agencies. Each Health Link will have one of its providers play a co-ordinating role.
- Each Health Link will work with its LHIN to develop personalized care plans for seniors and other patients with complex conditions, and to increase the number of those patients with a primary care provider.
- Patients with complex conditions include seniors, those with multiple chronic diseases, and those with mental illness and addictions
- A recent study found that 75 percent of seniors with complex conditions who are discharged from hospital receive care from six or more physicians and 30 percent get their drugs from three or more pharmacies.

Source: Ministry of Health and Long-Term Care

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# Research, innovation, knowledge translation boost performance in Alberta

BY KATHLEEN THURBER

Alberta is all about knowledge translation “writ large”. A convergence of opportunities, political will, social need and strong provincial research and innovation capacity is resulting in a push for putting knowledge into action as never before. But the changes aren’t necessarily obvious, nor are they seen as part of a cohesive effort to knit health research and healthcare into a seamless dynamic fabric. It’s time to start talking about Alberta as the vanguard of knowledge translation.

**Knowledge translation as a government priority:** Alberta Innovates – Health Solutions (AIHS) is in a partnership with the province’s ministry of health and its health system – Alberta Health Services (AHS). This partnership and proximity enables AIHS to take up a substantive mission: to help develop a culture and capacity for research within the healthcare system to create positive change. By using research evidence, those involved in the healthcare system will make things better – process efficiencies, costs savings and good experiences for patients. Equally important, the needs of the system – the on-the-ground issues experienced by clinicians and patients – will form the target for new dimensions of AIHS research support.

**Knowledge translation in the health system:** The mechanisms for this dynamic knowledge translation activity are the research networks launched by Alberta Health Services over the past few years. The Strategic Clinical Networks (SCN) address areas of health (e.g., cancer care, seniors’ health, bone and joint health), and are working to

reshape healthcare to provide a patient-focused, quality health system that is accessible and sustainable for all Albertans.

The Operational Clinical Networks (OCN) address service areas (e.g., surgery, emergency care, critical care) and will work with SCNs to help them meet service needs in their area of health. These networks are the ‘pipelines’ for the bidirectional flow of research needs and research evidence uptake, and were created to ensure healthcare dollars result in value for money.

Each network is led by a scientific director, who champions a broad provincial health research and innovation agenda in his or her area, with a focus on generating and applying research evidence. By engaging health researchers, front-line, and knowledge users, the scientific directors of these networks will develop, implement and assess the impact of a research and knowledge translation strategy that will support the overall mandate and objectives of each network.

Working with AHS, Alberta Innovates – Health Solutions recently created the Partnership for Research and Innovation in the Health System (PRIHS) Fund, a funding strategy that supports the networks’ development of research agendas and activity. Targeted specifically at the 10 existing networks, the goal is that PRIHS will be sustained through monies realized by efficiencies resulting from research put into action in the health system.

An example of an SCN in action is the Cardiovascular Health and Stroke SCN whose team has developed an app to help clinicians monitor dosage and complica-

tions in heart failure. The Cardiovascular SCN’s goal is to bring the most forward-thinking and comprehensive prevention, treatment and disease management strategies to every Albertan. The key to the Cardiovascular Health and Stroke SCN’s success will be the innovations that result

The launch of the Canadian Institutes for Health Research’s (CIHR) Strategy for Patient Oriented Research (SPOR) is the signal nationally that knowledge translation – with the patient at the centre – is the dynamic driver, rather than an outcome, of research. A pan-Alberta consortium has applied for a provincial SPOR Support for People and Patient-Oriented Research and Trials (SUPPORT) Unit to build up muscle in seven critical platforms or dimensions fundamental to the success of the spectrum of health research – from data platforms to patient engagement. AIHS is the provincial lead on making the partnership happen and has a keen vested interest as the co-funder (with CIHR) for making the consortium and initiative successful.

The consortium’s vision is of a virtual SPOR SUPPORT Unit composed of a network of people and resources with a central administration node at AIHS that is accountable to the funders. The hope is that through the SPOR SUPPORT Unit, researchers all over the province will have ‘one-stop shopping’ for data platforms and services, tools, methods, training, and technical support.

**Making knowledge translation a provincial recruitment priority:** In July, AIHS introduced its first Translational Health Chair to the world, Dr. Lee Green, a primary care physician and research leader recruited to Alberta from Michigan. Dr. Green and his team want to raise the bar on the quality of care Albertans receive. To do this, he and his team will work with practices all over the province to come up with new ways to deliver better and more efficient care. They want to see system-level improvements while avoiding the duplications of research efforts.

The AIHS Translational Health Chairs Program has at its core the fundamental tenets of knowledge translation. Developed in collaboration with the University of Alberta, University of Calgary, University of Lethbridge and Athabasca University, the Chairs Program aims to attract leading researchers to Alberta to build translational capacity in priority health research and innovation areas. Four areas of focus that are priority areas for Alberta were agreed upon by the institutions: Innovative Health Services Delivery, Chronic Diseases, Mental Health and Addictions, and Health Promotion and Disease Prevention.

**Knowledge translation leadership:** AIHS’s knowledge translation unit is known throughout the province as the mobilizing engine for agencies and individuals to learn, share, and participate in KT practices ranging from scholarship to hands-on health literacy programs. AIHS convenes an annual national KT conference – held October 9-11 this year in Banff – for the provincial network of KT practitioners to connect and learn. One of the highlights of the conference will be a case study of the Cardiovascular Health and Stroke SCN’s knowledge translation activity.



Translational Health Chair Dr. Lee Green is leading a research team.

from active engagement with clinicians, users, patients, and members of the public.

**Knowledge translation in the health research community:** AIHS has a role as a broker, facilitator, enabler and supporter of all dimensions of health research, including the knowledge exchange between disciplines and branches of research activity. This is underscored in the organization’s signature Collaborative Research and Innovation Opportunities funding program. Consisting of a triad of opportunities, the CRIO program embeds end-user – patient, policy developer, researchers in other fields, clinicians – engagement as a requirement for success.

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Kathleen Thurber is Director of Communications, Alberta Innovates – Health Solutions.

# The new Humber River: North America's first fully digital hospital

BY GERARD POWER

Toronto's Humber River Hospital is designing a new model of patient-centred care in what will be North America's first fully digital hospital.

While the doors of the new hospital aren't scheduled to open until the fall of 2015, construction of the new Humber River is already well under way. As the building progresses, the hospital's Redevelopment and ICAT (Information, Communications and Technology) teams continue their work designing and testing the new technologies, systems and processes that will be implemented in this state-of-the-art hospital.

"Redevelopment provided Humber with a unique opportunity to rethink hospital design and systems by putting the patient at the centre of the design work from Day One," said Dr. Rueben Devlin, President & Chief Executive Officer at Humber River Hospital.

As for the elements and technologies that will make the new Humber River Hospital truly digital – there are many.

"We are creating an environment where all the technology is integrated and interoperable," said Peter Bak, HRH chief information officer (Redevelopment). "Humber River's vision not only embraces the Electronic Medical Record (EMR) – but also automation through the use of robotics, software driven workflows and business intelligence. It allows for a mobile, responsive workforce that has access to data anywhere, anytime."

But what does that mean for Humber River patients, families, nursing staff, physicians and support workers?

"An integrated operation avoids duplication of work, lessens room for error and improves service, safety and efficiency," noted Barb Collins, HRH COO and redevelopment project lead. "For example, current plans for the new hospital call for self-serve check-in. Patients may do it on line at home before coming to the hospital, or at one of the self-serve check-in kiosks in the main lobby, similar to at some airports. The patient's record is automatically updated, and the registration desk, along with any other required service, is notified. You won't have to answer the same questions over and over – it will be 'one-stop' information collection and sharing."

The following are some practical examples of the "digital" components that will be implemented at the new Humber River Hospital:

- Automated Guided Vehicles (AGV) integrated with the Unified Communications Infrastructure (UCI) will deliver supplies, selected equipment and non-narcotic medications. They will notify the appropriate staff that they have been delivered to the unit or service area and are now available to them. In fact, 75 percent of all deliveries within the new hospital will be done using automation.

- Integrated Bedside Terminals allow patients to control the comfort of their environment: heat, light, electronic window opacity; to communicate with their care team on their mobile devices; to see their entire EMR, including test results and images;

to identify any hospital team member who enters their room on the screen; and to show a schedule of upcoming appointments and medication times.

- Operating Room infrastructure will be integrated with the UCI such that live video/audio is streamed to mobile devices

for immediate consults with either internal or external physicians.

- A "Maitre D" solution that notifies patients when their appointments are ready, allowing them to relax in the food court or other lounges rather than sitting in the waiting room of the clinic.

- Medication distribution and verification technology that ensures the right patients get the right medication at the right time.

*Gerard Power is Director, Public & Corporate Communications, at Humber River Hospital in Toronto.*

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# A new approach to improving the lives of complex care patients

BY JANAK JASS

**A**t Bridgepoint, in Toronto, our focus is on transforming the lives of people living with the most complex health conditions. This year, we realized a tremendous milestone in achieving that goal with the completion of our brand new state-of-the-art hospital and the introduction of our active healthcare model.

We didn't just build a new hospital of 464 beds and 680,000 square feet; we engineered a new approach to treating a growing patient population. The approach is called active healthcare because patients themselves – and their families and support networks – play the central role in defining and achieving their own care goals. Patients don't live their lives in hospitals, and most of the events that lead to complex conditions don't happen in hospitals. So active healthcare takes a sustained and lifelong view that treats the whole person.

Active healthcare is based on an integrated and customized solution for each patient. It draws on an inter-disciplinary team that extends beyond our own walls, and addresses all the factors that contribute to the patient's health. It is this collaborative approach that allows patients to receive active rehabilitation and return home.

The opening of our new hospital represents a critical step in delivering active healthcare. And strange as it may sound, it is a milestone in helping us to become more than a hospital. In designing and developing the new Bridgepoint, we challenged the most basic assumptions about

what a hospital should be and what role it should play in healthcare.

We have deliberately blurred the lines of public and hospital spaces in a calculated move to reduce the barriers to the outside world and maintain a patient's connection to the community. We achieved this by using cutting-edge innovations in the hospital's design – features such as our floor-to-ceiling windows in every patient room, our calming labyrinth, our internet café, roof-top garden, patient lounges and our grand west terrace all play a significant role in keeping the connection with our environment, parks and green space.

Nothing in our new building is ornamental or accidental. From the floor-to-ceiling windows, which preserve a patient's link to the community and inspire health and healing, to the rehabilitation spaces on



Bridgepoint's therapy pool features glass walls for monitoring.

every floor that accelerate each person's functional improvement, it is designed to enable restorative care for real life in real time, and to support our patients' return to the community.

We have embraced many forms of new technology to accelerate patient recovery

times. Our controlled multi-sensory environment room, more commonly known as a Snoezelen room, is a therapy space specifically designed to deliver stimuli to various senses using special lighting effects, sound, scent and colour. This therapy is primarily used for patients with various types of brain injuries or trauma.

The therapy pool is another area where patient recovery times are excelling – it is our oasis of healing. The innovative glass wall feature allows for better observation of a patient's response to treatment. The therapist monitors a patient's range and motion and can immediately make the necessary adjustments.

Patients are at the core of the hospital design and our active healthcare model; they enjoy computers in every patient lounge, the internet café and the patient library.

## Dominic Covvey

CONTINUED FROM PAGE 9

teach, various organizations with which I am associated, the discipline of eHealth itself and, of course, to society through its laws, regulations and standards of morality.

I was stimulated to think about this on hearing of complaints to an eHealth program leader about graduates having arrogant attitudes and not functioning well in their jobs. However, attitudes are a challenge for everyone in all disciplines. Imagine, for example a nurse whose attitude toward patients was one of disdain, or a physician who blamed patients for getting

sick or being a burden. It may be time for us to renew our awareness of and commitment to professional ethics, as a Code of Ethical Behavior is really based on the attitudes we must have in order to be considered a professional. Each of us has challenges related to developing and sustaining proper attitudes. Addressing these challenges is how we mature, progress as human beings and become better and better at who we are and what we do.

Attitudes can be learned, but in order to learn them we have to self-assess or be evaluated and recognize problem areas. Bad attitudes can be deadly! How many of us have known people whose knowledge was comprehensive, whose skills were ex-

pert and whose experience was long, but a poor attitude disrupted their careers? Certainly some of the instances comprising the eHealth debacle are illustrations of less-than-appropriate attitudes!

The articles in CHT that I wrote about a year ago, on The Seven Deadly Sins of eHealth, indicate key areas where improvement is needed in each of us. Sometimes the problem is a toxic level of pride, or noxious arrogance, or venomous envy ... or sometimes just diluted doses of these poisons. None of us is perfect and we all need to improve our attitudes. I've suggested that attitudes should actually be taught in school and evaluated as part of certification. I've also mentioned that not everybody can develop the necessary attitudes to fill particular roles.

Why is this even more important today? Quite simply because the Human Factor has become the dominant factor in the success of eHealth. We can no longer effectively hide behind technology as if it tied our hands, or cite strictly financial reasons for our deficiencies – even though these are significant

**How many of us have known people whose knowledge was comprehensive, but a poor attitude disrupted their careers?**

environmental issues – or blame our vendors, or dump responsibility on someone else. Very often, the weakness is within.

In continuing this series, our idea was to look at aspects of the eHealth domain that need to be rethought. Well, you and I are key aspects of the eHealth domain. We conceptualize eHealth, we design or develop or deploy eHealth solutions, we implement eHealth, we put it into use, and we tried to make of it something of value. Our ethical framework must be suitable for a professional in eHealth. It must be the bedrock for our actions. If our attitudes are not appropriate, very often our eHealth contributions will fail to satisfy or just plain fail.

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

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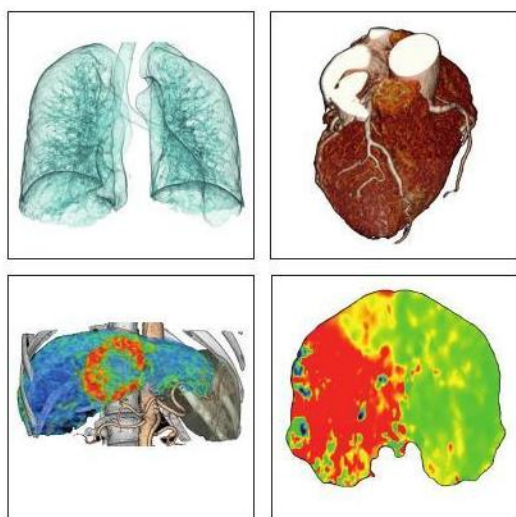
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