

# MEDICAL TECHNOLOGY

3  
FACTS

ABOUT THE  
FUTURE OF  
MEDICAL  
TECHNOLOGY

- Diagnosing with PET imaging
- Reducing surgery healing time
- Proper care of your wounds

## ADVANCING HEALTHCARE THROUGH DISCOVERY AND INNOVATION

Improving life, alleviating pain, and  
**enhancing quality of care** for all Canadians



**GLOBALLY COMPETITIVE HEALTH  
SOLUTIONS FOR THE WORLD**



A proud member of the  
Alberta Innovates family



# CHALLENGES

**Canada must ensure the longevity of a strong healthcare system.** This can be accomplished in part by adopting more advanced technologies, pursuing leadership through innovation and investing in future careers in medical technologies.

## Investing in innovation for a healthier Canada

Healthcare providers may be coping with an increasingly austere financial environment along with the rest of us, but improving patient outcomes and reducing costs continue to be pressing priorities.

### From challenge to change

To meet those essential goals, the healthcare sector must continue to invest in technologies within a holistic framework. It's equally clear Canadian ideas and technology must drive this change.

But inventors seeking to translate their intellectual property into healthcare technologies and enter the Canadian marketplace encounter pervasive challenges. Whether you're creating a medical device that presents data from multiple clinical systems in a single, intuitive interface, like VitalHub's Chart for the iPod or iPad, or software to objectively identify medical deterioration in children and respond with timely treatment, like Bedside Clinical System's Bed-PEWS system, the hurdles to market entry are greater than surmounting the cash flow valley of death.

### Passing regulatory hurdles:

Regulatory bodies, such as OHIP in Ontario, HMOs, or insurance agencies in the United States, must approve healthcare products for them to gain market entry. These same bodies also approve reimbursement pro-

cedures for hospitals, clinics and other medical facilities to purchase said products. Companies that don't grasp the regulatory process to engage in successfully navigating it, run the risk of a perpetual stay in commercialization limbo.

### Getting buy-in from opinion leaders:

Getting buy-in for the new product from key opinion leaders within the medical community, such as doctors, surgeons, administrators and other influencers, gives new products a greater chance of being adopted within a hospital or other medical facility. This barrier is particularly important when seeking support for clinical trials, pilot programs and other experimental, small-scale deployments.

### Finding customers with cash to invest:

Canadian hospitals operate in a cash-strapped environment that doesn't often afford the financial flexibility. Administrators and medical professionals need to explore new ways to improve patient outcomes and reduce costs.

### Navigating a complex procurement process:

It's not enough to convince regulatory bodies to approve your technology. Many hospitals have a complex procurement process. Successful companies must convince numerous decision makers,



**Rafi Hofstein**  
MaRS Innovation President and CEO

MY BEST TIPS

### Healthcare innovations spin-off from MaRS Innovation and its member institutions

- ScarX is developing a topical cream to stop or reduce scars that form after surgery.
- OtoSim's learning bridge device for medical students improves their ear disease diagnosis skills from 50 to 80 percent in three hours.
- ApneaDX's sleep apnea diagnostic device, for home use, uses remote monitoring to collect data on par with that currently collected in sleep labs.
- BioDiaspora's system creates infectious diseases alerts as international travelers spread them worldwide, including for the upcoming 2012 Olympic Games in London.

FACT

1

APPROXIMATELY 60,000 LICENSED MEDICAL DEVICES ARE ON THE MARKET IN CANADA

gatekeepers and other influencers to accept their innovation and work within the procurement system.

### The MaRS Innovation Advantage

The innovations that Canada's healthcare system needs are emerging, and will continue to emerge, from southern Ontario's dense cluster of world-leading universities, hospitals and research institutions.

At MaRS Innovation, we understand the Canadian healthcare landscape and work with researcher-inventors within our 16 member institutions to convert their intellectual property into market-ready products.

Our sweet spot lies in the seed stage that follows academic discovery and the initial data validation provided by traditional research studies.

MI's funding resources and expertise provides a bridge to help inventors surmount systemic sector barriers, along with more traditional stumbling blocks posed by technical challenges and risks in market adoption, as well as securing investment capital and competing in a global marketplace. With support from federal and provincial funding partners, our accelerated funding process is improving technology translation and changing healthcare delivery in this country.

RAFI HOFSTEIN  
editorial@mediaplanet.com

WE RECOMMEND

**Dr. Mehran Anvari on Non Invasive Surgery**

PAGE 4

“Minimally invasive surgery really defines a change in approach that surgeons have undertaken in performing various more complex surgeries”

**Panel of experts** p. 7  
Biomedical engineering programs in Canada

**Electronic health records** p. 8  
A paperless future

MEDIA PLANET

MEDICAL TECHNOLOGIES  
FIRST EDITION, JUNE 2012

Responsible for this issue:  
**Publishers:** William Huynh  
william.huynh@mediaplanet.com,  
Paul Metcalfe  
paul.metcalfe@mediaplanet.com  
**Designer:** Steven Sachleben  
**Contributors:** Alberta Innovates, Peggy Ahearn, Tonya Facey, Catherine Harley, Rafi Hofstein, HDX, Sri Krishnan, Michel Labrosse, Geoff Maksym, Susan Martinuk, Tim Meyer, Indrani Nadarajah, Sherbrooke Innopole

**Managing Director:** Chris Vassallo  
chris.vassallo@mediaplanet.com  
**Business Developer:** Jessica Bowman  
jessica.bowman@mediaplanet.com  
**Production Coordinator:** Tyra Bouhamdan  
tyra.bouhamdan@mediaplanet.com

**Distributed within:**  
National Post, JUNE 2012  
This section was created by Mediaplanet and did not involve the National Post or its Editorial Departments.

FOLLOW US ON FACEBOOK AND TWITTER!  
[www.facebook.com/MediaplanetCA](http://www.facebook.com/MediaplanetCA)  
[www.twitter.com/MediaplanetCA](http://www.twitter.com/MediaplanetCA)

Mediaplanet's business is to create new customers for our advertisers by providing readers with high quality editorial content that motivates them to act.

## + DON'T MISS

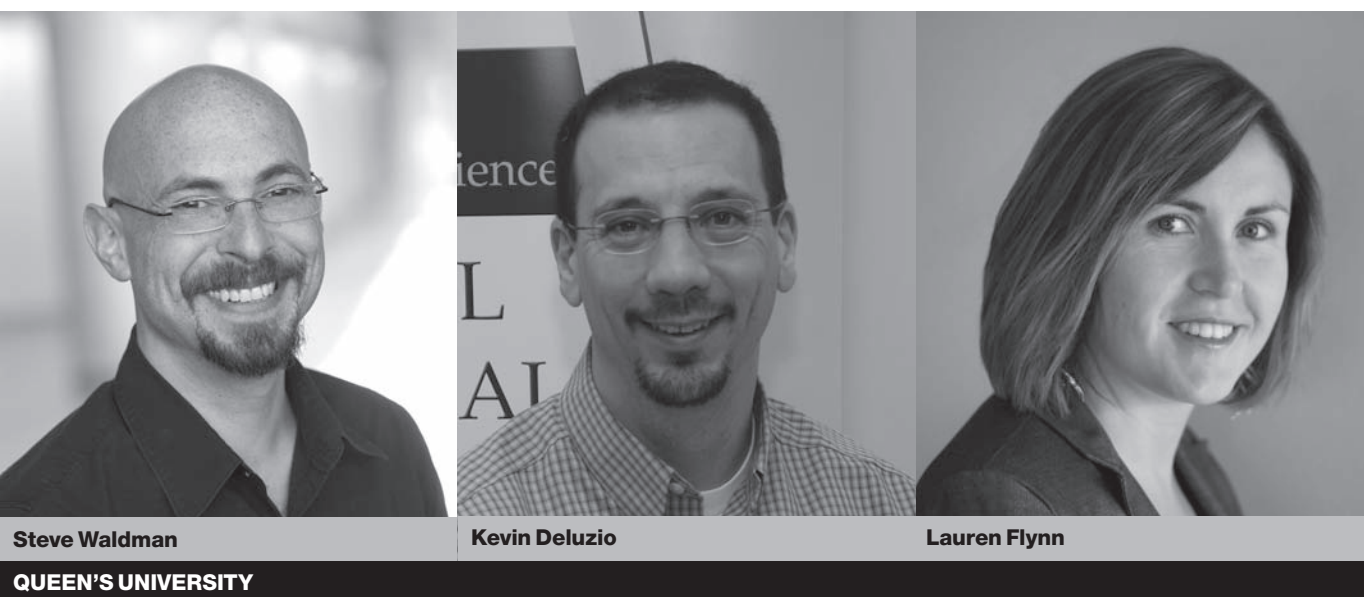
### Investing in innovation

**Quebec**  
**Sherbrooke Innopole** is an economic development corporation bridging the gap between education, innovation and economic growth in medical advancements. Renowned for its tremendous quality of life, the University of Sherbrooke is the most important university in Canada in annual revenues generated by discoveries and inventions and owns more than 350 patents. The strengths of Sherbrooke include clinical research (Phase 1 to 4, from the infant to the elderly), research on aging, molecular imaging and medical devices. This summer, the University launches its brand new Institute of Interdisciplinary Technological Innovation and the first bilateral Unité mixte internationale of the Centre national de la recherche scientifique (CNRS) in France. Sherbrooke has been chosen by some major players such as Charles River Laboratories.

**Ontario**  
**Investing in innovation — Ontario The Health Technology Exchange (HTX)** supports emerging and established Ontario-based companies to develop, produce and commercialize innovative market-leading advanced health technologies. Market segments include: medical devices, diagnostic & medical imaging, healthcare IT and wireless health (smart devices), assistive devices & home healthcare. Through HTX's \$21.4M Health Technology Commercialization Program (HTCP), HTX funds industry led projects to accelerate the commercialization of medical technology (MedTech) for Small and Medium-sized Enterprises (SMEs) and multi-National Enterprises (MNEs) in Ontario, serving global markets. HTX is focused on building a world-class MedTech cluster in Ontario and creating high-value jobs in sector.

SOURCE: SHERBROOKE INNOPOLE, HTX.CA  
editorial@mediaplanet.com

## Cookie-cutter treatments — no longer cutting it



Steve Waldman  
QUEEN'S UNIVERSITY

Kevin Deluzio

Lauren Flynn

**Doctors and scientists at hospitals and universities around the world constantly work to develop cures for diseases and medical technologies to help patients. Researchers at Queen's University in Kingston, Ontario are at the forefront of research taking place in the fields of biomechanics and tissue generation.**

### Patients in motion

A large part of biomechanics is assessing human mobility. Traditionally, this has been done through imaging systems such as CT Scans and MRIs, but innovations in medical technology are allowing doctors to quantify how people move. Using tools like motion capture technology, which is also used in computer animation, doctors can do patient-specific assessments of their patients' mobility and better iden-

tify treatment options. In the future, doctors expect to leverage patient-specific assessments even more and earlier in the process.

"The assessment would include imaging technologies like we have now but also include a mobility assessment where a patient-specific intervention would be simulated prior to the patient actually receiving it," explains Dr. Kevin Deluzio, Associate Professor in the Faculty of Engineering and Applied Science Mechanical and Materials Engineering at Queen's University. "We're going to be able to simulate that ligament repair and understand how that ligament repair should be optimized for this specific patient and predict how they'll function afterwards."

### Moving away from synthetics

Significant advancements in the areas of tissue engineering and regenerative medicine are also being made with a movement away from

synthetic tissues.

Dr. Steve Waldman, Co-Director of the Human Mobility Research Centre at Queen's University, describes the area of tissue generation as, "interventional strategies designed to either replace structures with living tissue that have been constructed in the lab or to encourage the patient's own healing process to rebuild damaged tissue."

Traditionally, the field has relied on using tissues developed in a lab but today there is an increased focus on using the patient's own tissues to repair any damage. "The body is more adept at building structures than we are," explains Dr. Waldman. "All the synthetic structures that we use to replace defective body parts only have a limited life span in the body for the most part."

### Custom solutions

In addition to using patient-generated tissue, future developments in

the field will see more doctors providing their patients with custom-made implants. The technology currently exists, however these custom solutions are expensive.

The advancements in biomechanics and tissue generation aren't independent of one another and will work together for optimal patient care. Doctors will likely be able to utilize patient-generated tissue and use patient-specific modeling to understand how it will affect the patient's movements.

With the current focus on biomechanics and tissue generation, expect to see these fields continue to evolve with further technological developments to assist patients in years to come. As the field continues to evolve, also expect to see career opportunities to meet the needs of these evolving technologies.

TONYA FACEY  
editorial@mediaplanet.com



# INSIGHT

## Advancements in nuclear medicine



Susan D. Martinuk  
Principal, Martinuk Ink

**The development of medical imaging technologies that “see” inside the body in real-time is considered one of the greatest advances in medical history. These technologies now play a vital role in the early detection and monitoring of almost all types of cancer.**

### Canada’s challenge

In Canada, computed tomography (CT) and magnetic resonance imaging (MRI) are the most commonly-used technologies and they provide doctors with a three-dimensional view of the patient’s internal anatomy, such as organs and cancerous tumours. However, Canada still has a relatively low number of scanners when compared to other countries, contributing to long wait times for CT and MRI exams that are critical to cancer care.

### New opportunities for early detection

As Canadians and provincial governments wrestle with these issues, research and innovation have brought about a new era in diagnostic imaging through positron emission tomography (PET). It can detect active cancer cells before they undergo the anatomical changes that create a tumour or mass that can be identified by a CT or MRI scan. That means PET can detect cancer cells at a much earlier stage than CT or MRI and, as we all know, early detection prompts more timely treatment and greatly improves the probability of a successful outcome.

### A national strategy

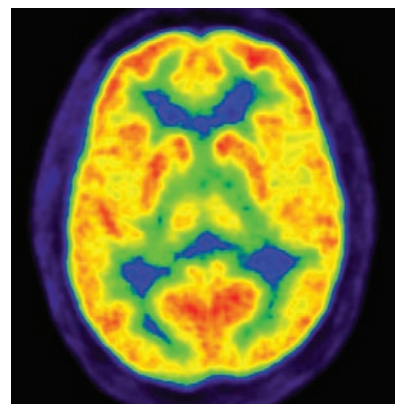
PET imaging is integral to cancer care in most developed nations, but a recent report, The Use of Positron Emission Tomography (PET) for Cancer Care Across Canada: Time for a National Strategy, shows Canada (except for Québec) is behind the rest of the world in adopting PET, and that access to, and utilization of PET varies widely from province to province, putting cancer patients in some areas

at a distinct disadvantage. The report was commissioned by TRIUMF and AAPS, Inc.

The high cost of PET technology is an obvious issue, as with CT and MRI. However, there is a growing body of evidence showing that PET can offset its’ high costs through improved decision making and more effective management of patients (by detecting cancer earlier, monitoring treatment cycles and establishing the most effective treatment for each individual). PET also eliminates the need for a majority of exploratory or biopsy surgeries and other diagnostic procedures, resulting in a more appropriate utilization of resources and producing even greater cost savings to the healthcare system.

### Education and awareness key to advancement

Canadian scientists have been at the forefront of utilizing PET for research purposes, but there have been numerous difficulties in getting physicians to embrace PET as a clinical tool. The most significant challenge is a lack of education and awareness about PET that is prevalent amongst cancer patients,



physicians and governments.

The report ([www.triumf.ca/pet-report](http://www.triumf.ca/pet-report)) is not so much about technology, as it is about the leadership that is needed to adopt and integrate these tools into clinical care. As Canadians discuss and decide the future of their healthcare system, the ability to incorporate proven, new technologies is a critical issue. Canadians should have easy and reliable access to advanced technologies such as PET. Our intention is to start the conversation.

SUSAN D. MARTINUK  
[editorial@mediaplanet.com](mailto:editorial@mediaplanet.com)

### → FACTS

“Nuclear medicine” might sound like an oxymoron: “nuclear” sounds ominous and dangerous, while “medicine” is all about monitoring and maintaining health and wellness. But in today’s modern world, nuclear medicine is not only one of Canada’s research strengths but it is also a powerful tool for physicians to investigate and heal disease.

### A quick overview

Nuclear medicine involves the use of small amounts of radioactive materials (i.e., medical isotopes) to help diagnose and treat a variety of diseases. Nuclear medicine determines the cause of the medical problem based on the function of the organ, tissue, or bone. These procedures permit the determination of medical information that may otherwise be unavailable, require surgery, or necessitate more expensive and more invasive diagnostic tests.

### In perspective

■ More than 1.5 million nuclear-medicine imaging and therapeutic procedures are performed each year in Canada. Of these, 40 to 50 percent are cardiac exams and 35 to 40 percent are cancer related. A good number are for studying brain disorders as well.

■ The amount of radiation in most nuclear medicine tests is comparable to and often less than that of a diagnostic x-ray.

■ There are nearly 100 different types of nuclear-medicine imaging procedures available today. Depending on the type of medical isotope used, the procedure is classified as a SPECT or a PET scan and a different imaging camera is used to collect the information and form the medical image.

■ PET scans are increasingly used, but the most widely used medical isotope in the world is technetium-99m for SPECT. In Canada, there are about 300 doses of technetium-99m administered to patients each day.

■ For cancer treatment in Canada, information from PET scans changed treatment protocols in more than 50 percent of cases.

■ In 2009, there were approximately 2,000 PET/CT scanners in the United States and more than 400 in Europe. There are less than 30 such scanners currently in Canada for use in clinical cancer care.

For more information, see <http://www.world-nuclear.org/info/inf55.html>.

T.I. MEYER  
HEAD OF STRATEGIC PLANNING AND COMMUNICATIONS, TRIUMF  
[editorial@mediaplanet.com](mailto:editorial@mediaplanet.com)

AHMED’S MOTHER PRAYED FOR A MIRACLE TO TREAT HIS BRAIN TUMOUR.

IT CAME FROM CANADA.

AHMED’S BRAIN TUMOUR WAS SUCCESSFULLY TREATED WITH RADIATION FROM ISOTOPES PRODUCED RIGHT HERE IN CANADA.

**NU** The Future is NU.  
Canadian Nuclear Association

To learn more go to [www.cna.ca](http://www.cna.ca)

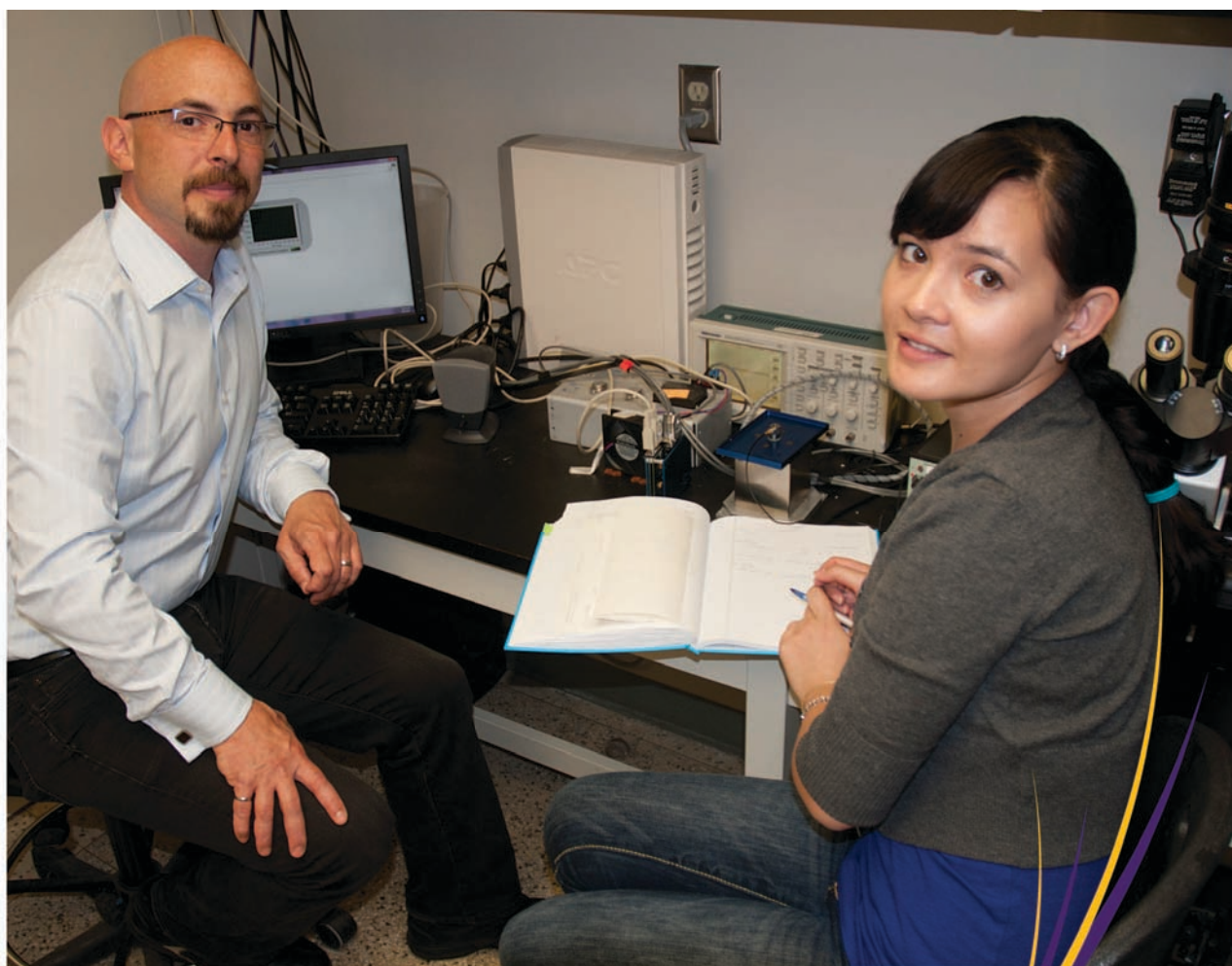
How do you beat cancer?

First, you have to find it.

PET imaging finds cancer at its earliest stages and is one of the most advanced tools for diagnosis, care, and management of cancer. But how easy is it to get a PET scan in Canada?

Go to [www.triumf.ca/pet-report](http://www.triumf.ca/pet-report) to find out.

Cancer patients need to know.



Queen’s Biomedical Engineering is doing something to improve human mobility.

Canada Research Chair Dr. Stephen Waldman and PhD student Joanna Weber are working on new techniques to generate tissue engineered cartilage which will help the millions who suffer from Osteoarthritis.



To find out more visit  
[www.queensbme.ca](http://www.queensbme.ca)



Faculty of Engineering and Applied Science



# NEWS

**Question:** How can patients undergoing surgery reduce healing times?  
**Answer:** By seeking out minimally invasive surgery options with their doctors.

# Minimally invasive with mega results



**Dr. Mehran Anvari**  
CEO and Scientific Director Centre for  
Surgical Invention and Innovation (CSII),  
CEO and Founding Director, The  
Centre for Minimal Access Surgery

## Minimally invasive surgeries: A new way to operate

Minimally invasive surgery, also known as endoscopic or “keyhole” surgery, is an alternative to traditional practice that has managed to change the norm for the number of surgeries done. As opposed to making one large opening with which to operate, doctors can now make small incisions, for a less invasive procedure.

“Minimally invasive surgery really defines a change in approach that surgeons have undertaken in performing various more complex surgeries,” explains Dr. Mehran Anvari, Chair in Surgical Innovation at McMaster University and Scientific Director at

the Centre for Surgical Invention and Innovation. “These surgeries have traditionally required large incisions on the body in order to gain access to internal organs or structures.”

This type of surgery relies heavily on technology. A long, thin tube with a small camera attached, called a scope, is inserted through the incision. The images from the camera are projected onto monitors in the operating room allowing the surgeons to get a clear view of the operating site.

Minimally invasive surgery techniques, which were regularly introduced in the late 1980s, are used in place of more conventional surgery methods for a variety of types of surgeries ranging from gallbladder removal to heart surgery.

## Benefits for patients and healthcare workers

Patients who are able to opt for minimally invasive surgeries are in for a pleasant experience. Minimally invasive surgery procedures mean smaller incisions, less pain, reduced risk of infection, shorter recovery time and less time in the hospital. In the case of gallbladder surgery where patients would traditionally spend between 3 to 5 days in the hospital, today most patients spend only a few hours in recovery at the hospital.

From a doctor’s perspective, the



PHOTO: CSII/ST. JOSEPH'S HEALTHCARE HAMILTON

use of the endoscope provides surgeons with a better look at what they are operating on and allows more people in the operating room to have a clearer view.

## Challenges in the field

One challenge is the lack of surgeons able to perform minimally invasive surgeries. As advancements are made and more surgeries are performed using less invasive techniques, there is a growing need for more surgeons to be trained. In some cases patients may require surgery that has a less invasive option however the lack of experiences doctors may steer them towards a more traditional surgical option.

## The future of minimally invasive surgeries

In a short period of time, many advancements have been made in the area of minimally invasive surgeries. Moving forward, many doctors predict that there will be an increased focus on the use of robotics to aid with surgeries and allow doctors to have a more tactile surgical experience while still performing a minimally invasive surgery.

“With minimally invasive surgery, one of the things the surgeons lose is a sense of touch as well as some degree of dexterity as you’re using long instruments at a distance from the organs,” explains Dr. Anvari. “With the robotics, you can regain some of

## → FACTS

■ Minimally invasive surgery techniques can be used for bariatric surgery including gastric bypass, spleen, adrenal gland and gallbladder removal, anti-reflux operations for GERD, and some cancer surgeries among others.

■ The first minimally invasive procedure was a gallbladder removal performed by doctors in France in 1987 and this type of surgery continues to be one of the most commonly performed minimally invasive procedures.

■ Endoscope technology dates as far back as the early 1800s with the invention of the “Lichtleiter” (light conductor).

those lost capabilities and give the surgeon more capability right at the site of the surgery.”

As anyone who has had surgery can attest, whether the more traditional type or minimally invasive, a very frustrating part of surgery is the ensuing scar. Current innovations are moving towards scarless surgeries. Patients will be able to undergo a routine minimally invasive surgery without developing a scar.

**TONYA FACEY**  
editorial@mediaplanet.com

So it's a pen but everything written with it will show up in your EMR, doctor? Well isn't that the niftiest gadget.

## From paper to pen to EMR, effortlessly

Electronic Medical Records (EMR) improve patient care. At Nightingale, we are committed to providing physicians with innovative solutions, making their transition to EMR easier, allowing them to work the way they want.

Clinipen™ digital pen is an EMR integrated digital writing solution that gives physicians and patients the ability to input structured data into a patient record directly from a paper form.

**For more information:**  
[www.nightingalemd.com/clinipen](http://www.nightingalemd.com/clinipen)  
[info@nightingalemd.com](mailto:info@nightingalemd.com)  
866-852-3663

## UPCOMING TITLES IN 2012

Global leading publisher of industry-focused reports distributed through mass media

July:

- Careers in Healthcare
- Personalized Medicine

September:

- Biotechnology

### Advertise with us!

Interested in participating in an upcoming section? Please contact Chris Vassallo, Managing Director of Mediaplanet Toronto.  
Phone: 416-583-2216  
Email: [chris.vassallo@mediaplanet.com](mailto:chris.vassallo@mediaplanet.com)

**TWITTER.COM/MEDIAPLANETCA**  
**FACEBOOK.COM/MEDIAPLANETCA**



# INSIGHT

**Question:** How have advancements in aerospace technology influenced the medical profession?

**Answer:** New technologies similar to the Canadarm have spurred robotic surgery options.

FACT

2

THE WORLD'S FIRST ALL-ROBOTIC SURGERY WAS PERFORMED IN 2010 AT MCGILL UNIVERSITY

# Robots — not just the stuff of science fiction



Jamie Bolger, MDA  
Director, Medical Robotics

## Robots lend a helping hand

Robotics, or the use of robots, has a place in many industries from manufacturing to space exploration. For years the medical field has increasingly embraced the use of robotics especially in a surgical setting. Robotics has gained popularity as

minimally invasive surgery procedures have become more common.

Robotics has many uses within the operating room including the popular robotic endoscope, which can be used in procedures such as laparoscopic surgery. A camera is attached to the end of a long tube and inserted into a patient during surgery in order to give surgeons a better look while operating.

## Better experiences for all

As robotics are used in minimally invasive surgeries, patients are able to benefit from less pain and scarring, fewer risks of infections, faster healing times, and shorter hospital stays.

Surgeons also benefit from the use of robotic technology whether by scaling up or down their movements or reducing the effect of tremors.

“A tremor is a fairly repeatable or



PHOTOS: CSI/ST. JOSEPH'S HEALTHCARE HAMILTON

known phenomenon and you can filter that out completely so that the tip of the robot is rock solid even if the input is under a certain tremor,” explains James Bolger, Director of Medical Robotics with MDA. “So you can get all the experience that a surgeon has gained over their career and continue to apply it without the concern of tremor.”

## The future of robotics

Today most medical robots operate on a pure master-slave robotic system where the operator moves a joystick and the robot responds accordingly. In a somewhat sci-fi twist, the area of robotics is becoming more automated.

According to Bogler, “I think one of the next innovations is going to be in automating certain procedures so that the surgeon doesn’t have to do every single step of a procedure.”

Moving forward, Bogler also expects to see robotics technology incorporate more visual or imaging feedback as well as tactile senses to aid the surgeon.

TONYA FACEY  
editorial@mediaplanet.com

DON'T MISS!

## The benefits of robotic surgery

### Patient benefits

■ More precise surgery: the goal of surgery is to remove the anomaly without affecting surrounding healthy structures. The small size and versatility of the robotic instruments makes this easier to do.

■ Less trauma and fewer complications: surgeons make tiny openings rather than large ones, decreasing the risk of infection and blood loss.

■ Shorter recovery: smaller incisions also mean recovery period is shorter, allowing patients to go home earlier following robotic surgery.

### Doctor benefits

■ Enhanced accuracy: surgeons have a superior view of the operating space. The high-definition camera provides a magnified, thorough view of the affected area, allowing the surgeon to see microscopic structures more clearly, resulting in more precise surgery.

■ Superior dexterity: a human hand can only move so much however a robotic instrument exceeds the dexterity and range of motion of the human hand. This increased flexibility allows surgeons to operate in a way that would be impossible without the surgical robot.

■ Accessibility to difficult places: the enhanced flexibility and meticulousness of the robot allows surgeons to access hard-to-reach areas. This enables them to treat more conditions with robotic surgery.



PHOTO: ISTOCKPHOTO.COM

CENTRE FOR SURGICAL  
INVENTION AND INNOVATION  
editorial@mediaplanet.com



## Sherbrooke and Life Sciences: THE PERFECT FIT

The Sherbrooke area has a strong research community with more than 200 researchers in 20 Research centers, ranging from sophisticated preclinical facilities to clinical research from Phase I to IV, a Faculty of Medicine, a Nano and micro technologies Center and an Institute of Pharmacology.

### SHERBROOKE INNOPOLE PROVIDES ASSISTANCE :

- FINANCING
- EXPANSION
- GROWING BUSINESSES
- START-UPS
- RELOCATION

sherbrooke  
innopole

sherbrooke-innopole.com



# PANEL OF EXPERTS

	<p><b>Geoff Maksym</b> PhD., Director, School of Biomedical engineering, Dalhousie University</p>	<p><b>Michel Labrosse</b> Associate Professor and Associate Chair, Undergrad Studies, Biomedical Mechanical Engineering, and Director, Ottawa-Carleton Institute for Biomedical Engineering</p>	<p><b>Prof. Sri Krishnan</b> Canada Research Chair, Biomedical Signal Analysis and Associate Dean (Research and Development), Faculty of Engineering, Architecture and Science, Ryerson University</p>
<p><b>Question 1:</b> What is Biomedical Engineering (BE) and how does it affect Canadians?</p>	<p><b>Biomedical engineers</b> use mathematics and physical sciences to improve our understanding of human health and disease. They develop technologies to better understand how our bodies work, and work with doctors to design devices to diagnose, measure and monitor disease as well as to assist people to improve quality of life. Biomedical Engineering is increasingly important to Canadians to help healthcare providers improve the lives of Canadians and people everywhere.</p>	<p><b>BE draws on the skillsets</b> and knowledge bases of medicine and engineering to improve healthcare diagnosis, monitoring and treatment. For example, lab-on-chip technology can determine your blood levels and type in seconds: priceless in the E.R.! Thanks in part to BE, people in Canada and worldwide can expect to remain active and maintain a good quality of life, even though society, as a whole, gets older.</p>	<p><b>Biomedical engineering</b> is an interdisciplinary field that brings engineering techniques, methods and tools to study, understand, interpret and solve medical and biological problems. Biomedical Engineering has immense impact on the quality of life and living of all Canadians. Biomedical Technologies are widely used in diagnosis, monitoring and treatment of many diseases including critical illness in cardiovascular and neuromuscular systems.</p>
<p><b>Question 2:</b> What distinguishes your BE program from all others in Canada?</p>	<p><b>Biomedical engineering</b> at Dalhousie offers applied research training in Biomechanics, Biomaterials, Imaging and Instrumentation from the heart and lungs to the connective tissues, joints and brain. Unique at Dalhousie is our training program in Medical Technology Commercialization and Innovation, ‘BioMedic.’ Students work in teams to develop devices with mentorship by frontline surgeons and clinicians in action at the hospital with team training in entrepreneurship and the business of medical technologies.</p>	<p><b>Our fully accredited</b> undergraduate BE program gives students a distinctive strength in mechanical engineering. Our graduate program (Master’s for now; PhD in the works) benefits from the unique mix of federal and provincial research and regulatory bodies, excellence in medicine, engineering and science, and presence of high-tech companies in the Ottawa area. Collectively, our research expertise spans the whole gamut of BE, from computational biology to biomimetics to surgical simulations.</p>	<p><b>Ryerson University introduced</b> the first standalone accredited undergraduate biomedical engineering degree program in Canada. Ryerson program provides students with a blend of theory, design and practice. Collaboration with hospitals and industries provides students with real-world experiential learning opportunities. Ryerson professors are leading researchers in the field focusing in the areas of biomedical instrumentation, signal processing and information technology, as well as rehabilitation engineering, biomechanics and biomaterials.</p>
<p><b>Question 3:</b> What career trends can students expect in the BE field and how is the industry shaping our future?</p>	<p><b>Biomedical engineering</b> is the fastest growing engineering discipline and the number of jobs is predicted to match training. Thus, the picture is fairly bright right now. Biomedical Engineering is important for Canada because healthcare is increasingly relying on technology, and to help Canada take advantage of its leading position in biomedical research, we need more bright young students to become the future designers, developers and researchers in this growing field.</p>	<p><b>Talents are for hire</b> to deal with people and leading-edge technology. Depending on their jobs, which are extremely varied, BE graduates interact with other engineers, technicians, researchers, clinicians, marketing teams and/or regulatory bodies. Of course, they must demonstrate excellence in engineering to be heard in such multidisciplinary environments. The demand for BE graduates is very high and steadily growing worldwide, although not necessarily just in their own backyards.</p>	<p><b>Biomedical engineering</b> graduates are typically employed in various sectors of health care technology industry, medical research facilities, health service, information technology and other engineering sectors. Some students pursue postgraduate research degrees in biomedical engineering and related areas. There are also some biomedical engineering graduates pursuing medical and dental school. Biomedical Engineers are also involved in entrepreneurial activities in starting up companies that deal with medical technologies covering hardware, software and apps. These activities augur well for the economic prosperity of the region.</p>

**So you want to go digital...**

**But what's the best way?**

**CONVERSION PLANET**  
A MEDIAPLANET COMPANY

Scan to read!  
Conversionplanet Delivers  
Higher than 1% Click-through  
Rate on Innovative New Type of  
Ad on USA Today.com

Visit [conversionplanet.com](http://conversionplanet.com)  
to find out what works

**SCHOOL OF BIOMEDICAL ENGINEERING**  
TECHNOLOGY FOR LIFE

**Biomedical Engineering & Innovation and Entrepreneurship Programs**

BioMaterials • Hearing and Balance  
Tissue Engineering • Biomechanics  
Instrumentation • Imaging

*Accepting MASC & PhD Applications  
Stipends and Scholarships Available*

**DALHOUSIE UNIVERSITY**  
*Inspiring Minds*  
Halifax, Nova Scotia  
[bme.medicine.dal.ca](mailto:bme.medicine.dal.ca)  
[BME@dal.ca](mailto:BME@dal.ca)

**Biomedical Engineering at uOttawa's Faculty of Engineering**

**Biomedical engineering is a rapidly expanding field!**

The purpose of the Biomedical Mechanical Engineering programs offered by the Faculty of Engineering at the University of Ottawa is to graduate engineers proficient in the areas of biomedical engineering related to mechanical engineering.

These include:

- the design of medical devices such as artificial hearts, implants and prostheses,
- the development and selection of bio-compatible metallic and non-metallic materials for implants and medical equipment,
- robotics for medical applications,
- biomechanics and rehabilitation engineering.

**Apply now to one of our programs:**

- Bachelor of Applied Science in Biomedical Mechanical Engineering (courses offered in French and/or English)
- Masters of Applied Science Biomedical Engineering

**For more information,**  
visit: [www.engineering.uOttawa.ca](http://www.engineering.uOttawa.ca)  
or contact us: [genie.engineering@uOttawa.ca](mailto:genie.engineering@uOttawa.ca)

**uOttawa**  
Faculté de génie  
Faculty of Engineering



## Ryerson University announces newly accredited engineering program

Biomedical engineering program accredited by the Canadian Engineering Accreditation Board

Ryerson University and the Faculty of Engineering, Architecture and Science are proud to announce English Canada's first and only accredited stand-alone undergraduate biomedical engineering program.

Students in this program will not only learn the essential mathematics, science, and engineering curriculum, they will develop a greater understanding of the environmental, cultural, economic, and social impacts of engineering on society. Graduates from this program are academically qualified to become Professional Engineers (P.Eng.) in Ontario.

Biomedical engineers apply engineering principles to medical problems. They develop innovative medications, materials, devices and processes for the prevention, diagnosis and treatment of disease and trauma. Students in Ryerson's program will

build a strong foundation in this crucial field while benefiting from Ryerson's close proximity to Toronto's medical district and access to seven world-class hospitals.

To learn more about Ryerson's fully accredited biomedical engineering program and other graduate and undergraduate engineering programs, visit the Faculty of Engineering, Architecture and Science website, [www.ryerson.ca/feas](http://www.ryerson.ca/feas).

Distinctly urban, culturally diverse and inclusive, the university is home to more than 28,000 students, including 2,300 master's and PhD students, nearly 2,700 faculty and staff, and 140,000 alumni worldwide. Research at Ryerson is on a trajectory of success and growth: externally funded research has doubled in the past five years.



**Question:** Why is multidisciplinary wound care essential to healing?

**Answer:** It tackles the root cause of wounds and addresses patient-centred concerns for optimal recovery.

# A CANADIAN HEALTHCARE CRISIS: CHRONIC WOUNDS



**Wound care is present in all areas of the healthcare system, whether in hospitals, clinics, long-term care institutions or the community.**



It is estimated that 30 to 50 percent of all healthcare interventions involve wound care, and it is further estimated that the annual cost of wound care in Canada is \$3.9 billion. Despite its significance, little attention is paid to wound care by healthcare policy-makers, politicians and the general public.

As the population ages, the incidence of both acute and chronic wounds is certain to become more prevalent. Dr. Gary Sibbald, a wound care specialist and Professor of Medicine and Public Health with the Uni-

versity of Toronto, emphasizes the importance of treating the whole patient. "New technologies only work when they are integrated with treating the root cause of the wound, providing optimal wound management and addressing patient-centred concerns," says Dr. Sibbald.

Foot ulcers are the most common cause of diabetes-related hospital admissions; they are also a common cause of leg amputations.

## A multidisciplinary healing approach

Antoinette is a 45-year-old woman who has had diabetes for approximately 10 years. She had a wound on her foot for about 3 months, which she was attempting to manage with an over-the-counter foot care cream; unfortunately, the wound was getting progressively worse. Her blood glucose levels were also increasing, despite her attempts to control her food intake. She knew that what she was dealing with could only mean trouble!

Antoinette was seen by a multidisciplinary wound care team, which included her physician, a chiropodist and a diabetes educator. It was determined that she had developed an infected wound. Her infection, wound and blood glucose control were all treated accordingly. Although it took almost four months, Antoinette's foot wound ultimately healed. She recog-

nized the importance of regular foot examinations and obtaining timely help from a wound care team, should she notice anything problematic in the future.

"By working together, we can maximize our effectiveness in raising the profile of wound care within the health-care system."

Fortunately, Antoinette had a good healthcare outcome. We know that 45 to 85 percent of amputations are preventable with early recognition and management by an integrated, multidisciplinary wound care team.

## Wound Care

The Canadian Association of Wound Care (CAWC) is a not-for-profit association of healthcare professionals, researchers, corporate supporters, patients and caregivers are dedicated to the advancement of wound care in Canada, and to improving the lives of

FACT

3

ACCORDING TO THE CANADIAN ASSOCIATION OF WOUND CARE, THE AVERAGE COST OF TREATING A CHRONIC WOUND IS \$10,376

↓

HEALING TIPS

Catherine Harley  
Executive Director, CAET

## When a wound appears, specialized nurses can make the difference

→ Are you suffering from a Diabetic Foot wound, an ulcer on your lower leg, or a long term pressure ulcer? If so, who you have involved in your care can make a difference as to how quickly you recover. You may want to consider asking for an Enterostomal Therapy Nurse (ETN), also known as an E.T. Nurse.

## What is an ETN?

→ An ETN is a registered nurse with advanced and specialized knowledge and clinical skills in wound, ostomy and continence care. Recognized as Nursing Specialists in wound, ostomy and continence, by the Canadian Nurses Association (C.N.A), ET Nurses are the only nursing specialty with C.N.A. certification in wound, ostomy and continence care. From acute care hospitals, outpatient clinics, community, long term care and independent practice, an ET nurse provides specialized holistic assessment and management as an interprofessional team member to meet the needs of individuals and families with acute and chronic wounds such as diabetic foot wounds, venous ulcers on the lower extremity and pressure ulcers. They also focus on specialized care for ostomies and urinary and fecal continence problems.

## What are the benefits of having an ETN?

→ ET Nurses involved in wound care heal wounds faster and at less cost.

When you seek the guidance of an ET Nurse, you will find that the length of stay in hospitals can be decreased by providing preoperative education and follow-up care. They will coordinate specialty care to reduce re-admission or duplication of services. They facilitate the appropriate and efficient use of resources and health care products and provide continuity of care to patients and families.

## An educated perspective on healing

→ Proactive Management to Health Promotion & Illness Prevention is evident when an ETN is involved.

An ETN maximizes patient and family self-care through one to one education and consultation, collaborates with inter-disciplinary team members to maximize healing outcomes and promotes patient and family advocacy.

ETNs support quality health care through teaching, mentoring, program development and quality monitoring, while promoting excellence in care by exercising evidence-based and innovative best practice. ET Nurses participate with other professional nursing organizations to develop and enhance the delivery of health care for Canadians. If you experience a wound, you should consider asking for an ET Nurse.

REFERENCES

HARRIS, C. SHANNON, R. AN INNOVATIVE ENTEROSTOMAL THERAPY NURSE MODEL OF COMMUNITY WOUND CARE DELIVERY: A RETROSPECTIVE COST EFFECTIVE ANALYSIS. J WOUND OSTOMY CONTINENCE NURSE. 2008; 35: 169-183.

BAICH, L. WILSON D. CUMMINGS G. ENTEROSTOMAL THERAPY NURSING IN CANADIAN HOME CARE SECTOR: WHAT IS ITS VALUE. J WOUND OSTOMY CONTINENCE NURSE. 2010; 37(1): 53-64.

editorial@mediaplanet.com

PEGGY AHEARN,  
EXECUTIVE DIRECTOR,  
CANADIAN ASSOCIATION  
OF WOUND CARE  
editorial@mediaplanet.com



# NEWS

## Improving the landscape for better health, lively communities, and a vibrant economy

**A dynamic interplay between government, industry, and academia is necessary landscape for providing solutions to global health challenges and economic diversification. Alberta Innovates is a globally competitive research and innovation system, which exemplifies such a multi-lateral collaborative approach, and uses knowledge for the growth and diversification of Alberta's economy.**

**Investing in innovative ideas**  
The Alberta Innovates system supports brilliant ideas that promise to improve our health and wellbeing, our communities, and our economy. Some of those ideas are already transforming lives. For example, people with reduced mobility are often confined to a bed or a wheelchair and are at constant risk of developing pressure ulcers—a serious health problem with considerable healthcare costs. It

is estimated that pressure ulcers cost the Canadian healthcare system \$3.5 billion a year.

After studying pressure ulcers in the lab for five years, scientist Dr. Vivian Mushahwar, funded by Alberta Innovates - Health Solutions (AIHS), gathered an interdisciplinary team of experts from across Alberta to develop methods for improving function and reducing the secondary complications associated with neural injuries and diseases. With \$5 million in funding from AIHS (including support from Alberta Health), Dr. Vivian Mushahwar and her team have invented Smart-e-Pants. These custom undergarments stimulate the backside muscles of people with spinal cord injury or stroke. The innovation is now being tested in Alberta hospitals.

Dr. Cy Frank, co-leader of the Alberta Osteoarthritis Team, formed another interdisciplinary team supported by AIHS, to tackle bone and joint health. The team successfully modified synthetic Calcitonin (a drug prescribed to

prevent bone breakdown) to target it specifically to bone, and limit its interaction with other tissues in the body. This result represents the development of a new class of drugs, and more importantly, could lead to a more effective treatment for osteoarthritis.

### Multiplying the benefits

Brilliant ideas nurtured by the Alberta Innovates system have led to the commercialization of innovations through the creation of new companies. Clinexus, a division of Alberta Innovates — Technology Futures, offers business support mainly to small and medium-sized companies developing technology products and services for application across the full spectrum of healthcare including wellness and disease prevention, primary and acute care, and palliative care.

One such company is Clinisys, an Electronic Medical Record (EMR) company, located in Edmonton. Clinisys is a company fostering a new breed of EMR as it is based on international HL7 healthcare standards, making it



**Vivian Mushahwar, PhD**  
Associate Professor, Department of Cell Biology, University of Alberta



**Cy Frank, MD, FRCSC** Co-Chair Professor, Department of Surgery University of Calgary/ Alberta Health Services

an interoperable system in the truest sense. It achieves compatibility and aggregates data from numerous medical sources into a simple, user-friendly, easy-to-use solution for all healthcare practitioners.

### Global impact

Clinisys participated in two Clinexus-supported initiatives: the company was part of Alberta's first Health Technology Mission to Asia; and was recently selected for the Canadian Technology Accelerator (CTA) program, located at UCSF's Mission Bay campus. CTA is a program under which Canadian life sciences and technology companies collaborate with the scientists in the United States to increase innovation and commercial endeavors. For more information visit: [aihealthsolutions.ca](http://aihealthsolutions.ca) and [clinexus.ca](http://clinexus.ca).

**ALBERTA INNOVATES**  
[editorial@mediaplanet.com](mailto:editorial@mediaplanet.com)



## Nudging doctors towards a paperless future

**When patients are at risk during a drug recall, physicians using Electronic Medical Records (EMR) could identify those who need to stop taking the medication ten times more quickly than their paper-based cousins, according to a recent independent study by St. Mary's Research Centre, MedbASE Research and McGill University.**

Yet fewer than half of Canada's physicians used them in 2009, according to the Commonwealth Fund Study, which saw Canada trailing Norway, Denmark, Australia and the United Kingdom, where some 90 percent of physicians are EMR-enabled.

"To think we live at a time when we can schedule the delivery of our dinner online, but we'll patiently wait on hold to manage our families' medical



**John Bodolai**  
Executive Vice President, Nightingale Informatix Corporation

appointments and immunizations," said Richard Alvarez, President and CEO, Canada Health Infoway. "I think Canadians are taking notice of this oversight."

Canada Health Infoway, which has been tasked with strategically investing Federal funds with the provinces and territories to nudge doctors towards EMRs, says much

has changed in the three years since the Commonwealth Fund study was released. Collaboration across Canada has been fueled by recent federal investments, along with the leadership of the faculties of medicine, pharmacy and nursing, who recognize the importance of preparing clinicians to work in IT-enabled environments.

### Why the slow uptake?

EMR's slow uptake is puzzling. Various theories have been offered to explain this, many suggesting that physicians are resistant to technology.

Nightingale Informatix Corporation executive vice president John Bodolai isn't convinced. "Physicians tell us that the efficiencies and the clinical value EMRs add to their practices far outweigh the learning curve." Usability design, adds Bodolai, is very important.

Many doctors may find the idea of implementing an EMR daunting and

question whether the process will increase their workload. Others worry about maintaining the IT infrastructure.

"The design needs to complement and simplify a clinician's workflow in order to be beneficial," Bodolai offers. "For some doctors, maintenance might be a concern. These are valid points for physicians to raise, and as EMR providers, we have a responsibility to address and help find solutions."

### Small adjustments help

Introducing small adjustments that don't intimidate and don't require extensive training is one way to reach doctors who have concerns around the usability of EMRs. For example, Nightingale recently introduced the Clinipen, a blue-tooth-enabled digital writing device, which allows healthcare providers to input structured data into a patient's EMR direct-

ly from paper. "This is conceptually similar to a doctor working with pen and paper."

Even if physicians continue to be reluctant to embrace EMR technology, increasingly, patients are going to be a force to reckon with, says Bodolai. They will expect to be able to book appointments, and view their personal test results online. Some practices in North York and Windsor already use patient portals. The next generation EMRs will be more focused on usability, not just usefulness. "The first generation of EMR involved getting data into the system. We are now getting the workflow and processes to fit in with what doctors are used to and expect."

**INDRANI NADARAJAH**  
[editorial@mediaplanet.com](mailto:editorial@mediaplanet.com)