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INSIDE:

healthcare IT innovators. There is a healthtech boom going on, with investors backing new solutions.
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PHOTO: COURTESY HIMSS

Hillary lauds Obamacare for improving lives

Former U.S. secretary of state Hillary Clinton, a keynote speaker at HIMSS '14 in Orlando, Fla., observed that health reform in the United States is providing millions of people with medical insurance for the first time. To an overflowing audience, the possible 2016 presidential contender argued that continued debate on healthcare reform is needed, aided by evidence rather than ideology. **SEE MORE HIMSS COVERAGE ON PAGE 8.**

Cornwall hospital races ahead on wireless technology

BY JERRY ZEIDENBERG

Cornwall Community Hospital, in Cornwall, Ont., has become one of the first hospitals in Canada to implement a brand-new wireless technology that runs as fast as 2.6 gigabits-per-second – as rapidly as a high-speed wired system.

The installation means the Cornwall Community Hospital could conceivably go with a completely wireless strategy in the future – where no computer workstation, phone or medical device requires cabling.

It is also an important step in the organization's mission to reach HIMSS Analytics Level 6 in the EMRAM scale, which requires it to be a completely paperless hospital. "That means no more jotting down vital signs or other notes on paper," commented Mario Alibrando, director of information technology.

"We're soon going to acquire an inte-

grated system that can wirelessly transmit all information to the electronic health record," he said. "So all IV pumps, and all medical devices, will automatically transfer information wirelessly."

The benefit, of course, is an increase in patient safety, as the automated transfer of vital signs and other information would reduce the transcription errors that occur when data is keyed-into computers. As

Cornwall Community hospital races ahead on new wireless technology

well, it would reduce the paper burden on nurses and allow them more time for patient care.

The new wireless standard that's supporting all of this is called IEEE 802.11ac. It just became available last year, and it is a dramatic improvement over 802.11n, which it supersedes.

Cornwall has acquired the leading-edge systems from Meru Networks, of Sunnyvale, Calif., a leader in wireless and a supplier of solutions to more than 12,500 customers in 59 countries.

802.11ac's operating speed of 1.3 gigabits per second, per radio, compares with just 300 megabits per second, per radio, for 802.11n – which was considered to be incredibly fast just a few years ago.

Just as importantly, the new standard can support a huge number of users without a drop in performance. "On any given day, we have about 200 wireless users connecting to the network at the same time," said Alibrando. "Nobody has experienced any degradation with the new system."

Alibrando noted that most hospitals have implemented wired systems that deliver gigabit speeds to the desktop – which is considered to be a major achievement. However, they're still struggling on the wireless side, as they're using the older 802.11n at a time when demand for wireless bandwidth is exploding.

That's because large groups of clinicians and administrators want to make increasing use of wireless devices, such as iPhones, iPads and Android phones.

According to Alibrando, the new 802.11ac wireless technology is more reliable than traditional cabled systems – something strange but true. He explained that 802.11ac has complete failover capabilities; by contrast, wired systems make use of routers and hubs that require manual resets if they go down.

Cornwall tested the 802.11ac technology before acquiring it, and found that it delivered even large image files to radiologists using wireless devices – quickly and without system degradation.

Alibrando said that radiologists wouldn't typically work on mobile devices, but in the future, their workstations could be outfitted with wireless cards and wouldn't need cabling. It's possible that cabling won't be needed at all, in any area of the hospital.

"That will save us $300 per cable drop," he said, explaining that hospitals require a special way of running cables above ceiling tiles to avoid contaminating the rooms with dust and potentially infectious particles. "It takes four times as long to run ca-

> Some hospitals are struggling with wireless, as they're using older technology when demand for wireless is exploding.

ble in a hospital as it does elsewhere," said Alibrando. "The installers need to use rolling hoarding units, and they move only one ceiling tile at a time. It's very labour intensive."

"If we had this technology when we constructed our new building, we could have saved $120,000 in cabling," he said. Cornwall Regional recently constructed a gleaming 95,000 square-foot wing at a cost of $120 million.

Wireless computing throughout the hospital has been optimized by creating three levels of access, based on the priority of the users.

The first tier consists of 'Life Critical' applications, such as wireless IV pumps and telemetry.

The second level is called 'Mission Critical' and covers applications such as EMR, VoIP, Citrix-based CPOE and barcode medicine administration.

The third category consists of 'Patient Critical' applications, such as WiFi for patients and their family and friends.

Wireless channels are dedicated to each, but Meru does the job in a virtual way, meaning that performance is enhanced and fewer radios or access points are needed.

Alibrando noted that Cornwall Community Hospital installed only 150 access points to cover the entire facility; by contrast, other hospitals using older technologies typically use a far larger number.

According to Meru, the company's 802.11ac runs on standard power over Ethernet supplied by existing network switches. Most other 802.11ac solutions need additional voltage, requiring complete switch infrastructure upgrades.

Given the increased throughput, the new 802.11ac technology could even support wireless TV sets. The limitation right now, however, is that devices in current use don't have the cards needed to take full advantage of 802.11ac's blazing speed.

New devices will likely contain them in the future, as the standard catches on. Until then, devices equipped with other wireless cards can still benefit, as they will run at speeds of up to 300 megabits per second without experiencing any signal loss.

Meru customers, including Royal Caribbean Cruise Lines and the University of Houston, have publicly reported as much as 40 percent increased throughout when using the old 802.11n devices on the 802.11ac network.

Older 802.11n wireless systems boast a top speed of 300 megabits per second, but in reality, "you never get 300," commented Manish Rai, Meru Network's vice president of corporate marketing. "You might get half of that," he said.

Cornwall Community Hospital has also deployed many VoIP phones that use the high-powered wireless network. Instead of using cellular or wired technology, they run on the 802.11ac network.

Overall, the hospital is well placed to move ahead with a completely wireless strategy in the future, if it chooses. It also has the wireless infrastructure in place to support the move to the paperless hospital, with its attendant benefits of reduced medical errors and increased productivity.

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LTC 'Dragon's Den' draws innovators, both high-tech and high-touch

BY ANDY SHAW

It was hard to choose between the highs and the lows at the Ontario Long-Term Care Association's 5th Annual Research Day – high-tech and low-tech innovation, that is. Held as part of two frozen OLTCA February days at the Hilton Hotel in downtown Toronto, the event featured six 90-second presentations by long term care (LTC) innovators to a TV-style den of three sharp and experienced LTC dragons. All with the purpose of identifying new ways to improve LTC care and reduce its costs.

At the high tech end, the dragons and many of the other LTC researchers, innovators, home directors, physicians, policy makers, and even students in the audience heard the quick pitch by Tracy Milner, CEO of BrainFx, based in Markham, Ont. Its BrainFx 360 tablet-based brain health assessment tool wowed them all. In the hands of a trained operator, the 360 can measure the effects of mild to moderate brain disorders and spit out a comprehensive profile of a patient's entire neurofunction.

That profile, which is immediately actionable by caregivers, ranges across the person's cognition, mood, behaviour, balance, sleep, diet, and the normal activities of daily lives.

"It's a process that with traditional, manual methods would take professionals 20 to 30 hours to produce such a profile; but with the tablet we can get it down to less than two hours," said Milner, a practising occupational therapist. "So with the 360 tablet, we can get the cost of a complete neurological assessment that would normally run from $2,000 to $3,000, down to $75 or less."

Just as impressive was a $15 innovation, dubbed the 'Hidden Pocket', pitched to the dragons by Lynne Beer, a personal support

worker (PSW). This 11-year veteran of the Vision Nursing home in Sarnia, Ont., has worked the gamut of long-term care through transfer-and-lifts, palliative care, continence and best practice teams. But it was a brief discussion with Vision's falls prevention squad that first turned Beer towards her home sewing machine.

She designed Hidden Pockets to hold and hide a fall monitor securely on the back of a wheelchair. In that position, it is nearly impossible for a patient to remove the tattle-tale tab from their clothing before they attempt to get up without assistance.

Eschewing Velcro in favour of the venerable button, Beer designed Hidden Pockets to be held in place with an elastic, adjustable, button-holed strap that will fit any size of wheelchair back rest, or bed headboard, or lounging chair. Virtually anywhere a patient is not supposed to rise from without help. And if they do, they set off the hidden monitor's piercing beeps.

So impressed was Dragon Don Fenn with Beer's innovations that he subsequently offered to help Beer develop full-fledged business and marketing plans for her nascent business. Fenn is renowned in Canada for his commitment to LTC, especially in the home. He is chairman of the Fenn Group of Companies, president of Caregiver Omnimedia, and publisher of the Family Caregiver newsmagazine.

The other two Dragons in the OLTCA den were: Sarah Ferguson-Maclaren, a former North Bay General Hospital registered nurse who is now the eastern region operations director for OMNI Health Care Ltd. in Peterborough, Ont., an extended and nursing care provider, and Christine Ozimek, a 20-year LTC veteran who now is COO for PLTC, which owns and operates five long

term care/retirement living facilities. Both have a keen eye for new LTC technologies and the early phase companies, care facilities, or individuals developing them.

Accordingly, they and Fenn took careful note of what Lindsay, Ontario-based Extendicare Kawartha Lakes, a 64-bed long term care home, is doing with a Swedish-developed innovation, TENA Identifi, a 72-hour voiding assessment tool being piloted for the first time ever anywhere.

"It gives tremendous help to caregivers designing toileting plans for incontinent patients," explained Shelley Gallant, the clinical director for SCA Personal Care, a

Participants presented their innovations to the three seated dragons.

Swedish multi-national handling TENA products in Canada from its Drummondville, Quebec headquarters.

The pattern of voiding is tracked by sensors in the TENA undergarments patients are wearing and the resultant data is uploaded wirelessly directly to the TENA Identifi web portal. "The incontinence reports for caregivers are then generated by the portal meaning there is no software involved," said Gallant. "And importantly, you're not relying on patients to enter their voiding times manually."

Also in the wireless vein, Mark Seidenfeld, president and CEO of BCI Networks,

gave the dragons a fast-paced pitch for the company's SARA Wireless Emergency Call Systems.

"What it does is create a 'Wireless Bubble' as we call it around any facility," said Seidenfeld.

"And the Bubble encompasses not only the nurse call systems, but just about every other generator of emergency signals, including wireless repeaters, wireless pull and plunger stations, wireless smoke detectors, wireless temperature controls, and wireless pendants that can all be plugged into any 110-volt outlet.

"So it doesn't require any rewiring or changes to conduit infrastructure. That makes it affordable for retro-fitting LTC homes and facilities that are often older buildings."

Seidenfeld ended the Dragon's Den pitches on a high tech note, but they had begun earlier by the dramatic entrance of a presenter artificially disabled by a low tech "aging" suit. The $3,000 Japanese-developed, tan-coloured overalls with red restraining straps and disabling head and eye-ware are being used by the Baycrest Centre for Learning, Research and Innovation in Long-Term Care – in partnership with the Michener Institute – to mimic the ambulatory, hearing, vision, and other physical limitations of the elderly as they experience the healthcare system.

"We call it 'Taking a Walk in Their Shoes' and we use it to shift the values and attitudes towards elderly patients of Baycrest staff, as well as our support workers and visiting students," said presenter Jennifer Reguindin, a multiple degree-holding former RN who is now the interprofessional educator at the Baycrest Learning Centre. "They get in that suit and they can feel the limitations of aging themselves."

Early warning helps prevent unexpected code blues in pediatric patients

BY RAJESH SHARMA

Unfortunately, the harrowing scene of doctors and nurses running with crash carts to a child's bedside after an 'unexpected' code blue is a familiar one to most hospital workers. In 2002 Dr. Christopher Parshuram, a physician and safety scientist in the Department of Critical Care Medicine at The Hospital for Sick Children (SickKids) recognized that in most cases it was possible to identify children well before the immediate call for help was made. With the help of Kristen Middaugh, a paediatric intensive care nurse, they began careful research to see which vital signs could be relied upon to provide early identification of clinical deterioration in children.

"Through our research, and with the collaboration of 300 health care professionals and data from 5000 patients, the Bedside Paediatric Early Warning System (BedsidePEWS) was developed to help clinicians identify children who are clini-

cally deteriorating, allowing medical teams the time they need to intervene and prevent the need for immediate assistance from a resuscitation team," explains Dr. Parshuram.

In 2009, Parshuram and Middaugh published their results in Critical Care highlighting the development and initial validation of the Bedside Paediatric Early Warning System (BedsidePEWS) based on data from hospitalized children who were stable and those who were deteriorating.

The study concluded that a seven-item score can quantify severity of illness in hospitalized children and identify critically ill children with at least one hour notice.

In Critical Care 2011, a multicentre study involving 2,074 patients confirmed earlier results that BedsidePEWS score could identify children at risk for cardiopulmonary arrest. In the same year, a prospective observational study was published in Paediatric and Child Health showing that after implementing Bed-

sidePEWS, there was an 83 percent reduction in the rate of late transfers to referral centres and a 77 percent reduction in stat calls to in-house paediatricians.

Recognizing the need for appropriate dissemination of BedsidePEWS, and the requirement to develop a robust electronic form of BedsidePEWS, SickKids

> **BedsidePEWS, developed at the Hospital for Sick Children, is lowering the number of code blue events.**

and MaRS Innovation collaborated to establish Bedside Clinical Systems (BCS).

The program digitally logs, charts, and helps clinicians evaluate the seven vital signs that are part of routine clinical assessments and then summarizes them into a single score. From the BedsidePEWS score, care providers can better match the level of care with the patient's required needs, thereby improving
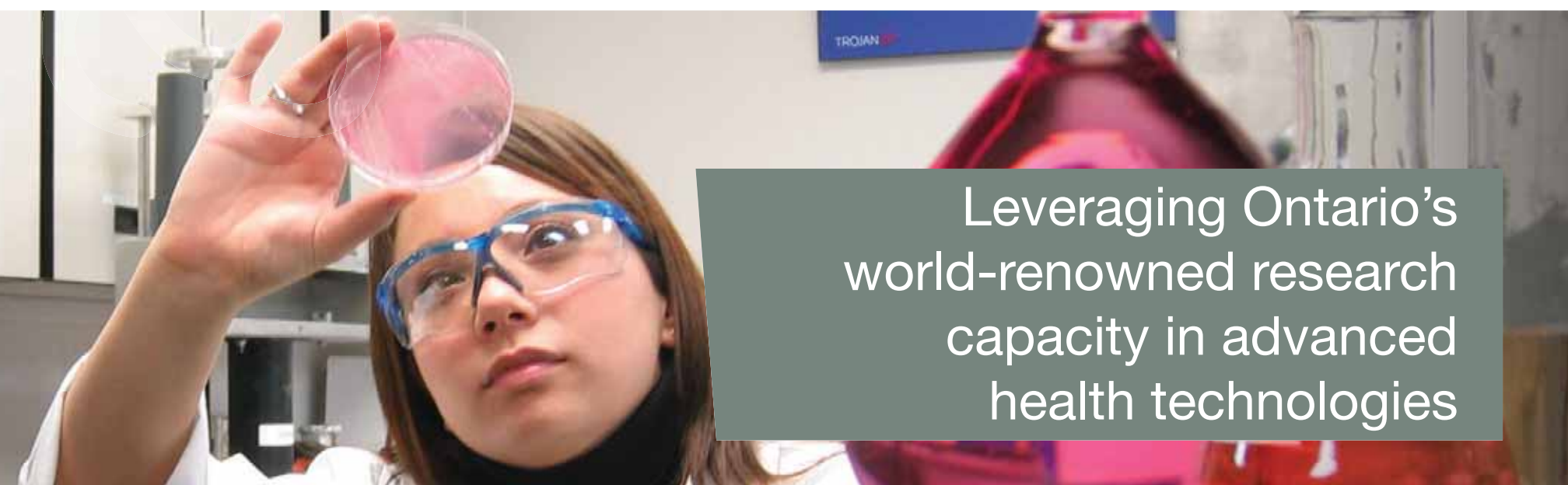
patient outcomes and reducing the number of urgent calls, code blue incidents, and related deaths.

"Identifying at-risk patients is significant since approximately 5,000 children in North America experience a code blue event each year, from which too many children die or sustain neurological deficit. BedsidePEWS hopes to improve outcomes for these patients and their families," says Dr. Parshuram.

BedsidePEWS is currently being used in hospitals in Canada, the United States, UK, Italy, and New Zealand. Unlike other systems, BedsidePEWS can be used on all pediatric patients regardless of their condition. It is the only FDA cleared system for children. For hospitals without electronic charting systems, BCS offers a paper documentation solution.

Rajesh Sharma is president & chief marketing officer at Bedside Clinical Systems. He can be reached at rsharma@bedsideclinical.com. For more info visit: www.bedsideclinical.com

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Mihealth gives patients quick access to their records, eases communication

The application can be downloaded to a patient's smartphone, tablet or computer.

BY BRANDI CRAMER

Joanne Aspin considers herself fortunate to have enjoyed good health throughout her life. But she hasn't come by it easily. "Each year, subject to what stage of life I was at, due diligence was done by way of appropriate healthcare maintenance – routine blood work, mammograms, paps, etcetera."

Still, as a professional businesswoman who travelled extensively, it took a lot of time to stay on top of simple tasks like booking annual checkups. "At one time, this whole process – from booking an appointment, to getting results – took 14 business hours of my time and this was for a healthy person," she says. Now 60, Aspin is starting to experience health issues that come naturally with age. "This of course means more time is required from my numerous healthcare providers."

But thanks to the introduction of Mihealth, Aspin has become an empowered partner in her healthcare. Mihealth is a messaging and personal health record (PHR) system that gives subscribers quick access to their personal health records and caregivers, when and where they need them.

Developed in 2011 by Dr. Wendy Graham, founder and CEO of Ontario-based Mihealth Global Systems Inc., there are now thousands of patients utilizing the technology. The application can be downloaded to a patient's smartphone, tablet or computer, giving them unfettered access to personal health records with medical information validated by their physician.

Mihealth also allows bi-directional messaging between patient and provider and incorporates high-end security certified by Canada Health Infoway (Pre-Implementation 2011). Offered on more than 236 mobile platforms, Mihealth is interoperable with EMRs and Remote Monitoring Devices.

"This is about empowering the individual to know about themselves and their family and take that data worldwide for the rest of their lives. It's a continuum of healthcare information," says Dr. Graham.

Traditionally, physicians took on more paternalistic roles with exclusive access and control of their patients' medical records. Technological advances are making it possible for patients to take some of that control and contribute to their own path of care.

Recently, Aspin put the EHR to the test when she experienced a health emergency. "I ended up in the hospital on Christmas day. What I was able to do was actually print off reports relevant to my particular case, take them with me to emerg and provide them to the doctor on call," she says.

Her ability to provide her medical history on the spot helped her get the care she needed. "I think any tool whereby patients have access to their own records instantaneously is invaluable," Aspin says.

Being able to outline allergies, fill in detailed medical history and see lab results shortly after they are available to her doctor has made a loyal user of Amanda Carvalho, vice-president of academics at a career college in Ontario.

"Through using it I've actually come to better understand my health and the treatment that my doctor gives me," Carvalho says.

It can be difficult for a patient to remember all the questions they want to ask about lab results or health issues they are having during a 15- to 30-minute appointment. Having access to their records, patients are afforded the time to review results, research issues and in turn message their health provider with additional queries. "I've done that before and I can say that getting a Mihealth message back from a busy medical office has often been easier than trying to get lucky and get through when lots of other patients are calling," Carvalho says.

Aspin and Carvalho are two of a growing trend of patients who are actively seeking out ways to facilitate interactions with their healthcare providers.

In a 2012 Harris Interactive Poll of 2,311 adults, 17 percent of patients had online access to doctor visits, prescriptions, test results and medical history, a number greatly outweighed by the 66 percent without the service who deemed it important or very important.

Results showed a similar disparity for all the tested

Mihealth links Joanne Aspin to her health records and providers.

services including email access to doctors (12 percent have, 53 percent important or very important) and online appointment setting (11 percent have, 51 percent important or very important).

So what's the hang up?

Like other innovative technological advances that make their way into the marketplace, it takes time to grow and convince the more conservative community it's a good place to go, explains Bill Pascal, Principal at Richard Warren and Associates and former Chief Technology Officer for the Canadian Medical Association.

"This is like any new capability that enters the workplace. There are early adopters. They are willing to take the risk because they see the value. They are 15 to 20 percent of the potential market," he says.

The other 80 percent are more conservative, but not necessarily against the technology. "They already have something that is working and for these providers to change, there has to be an increased value to go through a process to introduce new technology and the costs of making the changes.

A large portion of that group has already started to move to electronic health records, and increasingly, peer-reviewed research shows the benefits of physicians using a more digital environment to support patients.

The interesting part, Pascal says, is the fact the tools the people are utilizing – mobile technology – in their personal lives can be used in the health sector, much like the way we do our banking.

"We will see that grow into the care sector as the consumer is going to say 'Why can't I have an email chat or Skype with my doctor?'"

Mihealth is currently building a secure connection with Microsoft's Skype which will allow users video conferencing and real-time communication capabilities.

This opportunity is one that Dr. Adam Moir, a general practitioner in Dryden, Ont., believes could be of great value for a case conference with a patient whose family members are located remotely.

Dr. Moir, who recently received a grant to enroll 400 of his patients in Mihealth, says he does anticipate the added technology will increase his workload but believes the pros outweigh the cons.

"Here is a smartphone that can show a complete list of a patient's current medications. This makes patient care safer and has infinite potential," Dr. Moir says.

On average, established doctors have about 1,500 patients. Of those, Pascal estimates 20 percent need 80 percent of that physician's time – such as those with chronic diseases and geriatric patients.

Mihealth creates the ability for the consumer to work with healthcare providers, who have all the same devices and can interact in a virtual way. It lessens the need for face-to-face consultations based on the type of issues the patient has.

Mihealth users can also allow family members to access their records, giving peace of mind to children of aging parents seeking medical care.

The Alzheimer Society of Canada states e-health, such as Mihealth and other technology, is helping Canadians become more active partners in managing their healthcare needs. These tools are especially important for the caregivers of people living with Alzheimer's disease and other forms of dementia.

"It provides quicker access to medical information, doctor care and for people affected with dementia, this means they feel more empowered, informed and confident, helping them to remain active and independent longer," says Rosanne Meandro, a spokeswoman with the Alzheimer Society of Canada.

An eHealth policy paper published by the Ontario Medical Association in February delved into topics including governance, creating electronic records, data sharing and interoperability currently being tackled by provincial jurisdictions across the country. Pascal says a lot of these issues can be facilitated with Mihealth.

By way of example, the issue of data governance and who gets to see the information and for what purpose becomes a little easier when using the technology.

"If you give the information to the patient, the patient determines who gets to see the data. It is the patient's data. The file in the doctor's office is for regulatory purposes," Pascal says. "There is no one solution to solve all issues. But Mihealth goes a long way to make some of these issues go away or become more manageable."

Glooko brings interoperability, analytics to monitoring of diabetes patients

BY JERRY ZEIDENBERG

ORLANDO, FLA. – Many companies have produced diabetes trackers that upload readings from a patient's glucose meter to a computer or smartphone; some can even store the data in the web. However, most are proprietary systems from device manufacturers, and physicians using software from one company are unable to read the data when patients are using solutions from another supplier.

That makes supervising a large group or patient population difficult, if not impossible.

Now, however, Silicon Valley-based Glooko has produced a system that is interoperable with 29 different blood glucose meters, including devices from market leaders Lifescan, Freestyle and Roche.

"Our system covers 85 percent of the meter market," commented Rick Altinger, CEO of Glooko. "Providers love it, because they need just one package and they're able to monitor a whole patient population."

Blood glucose readings can be uploaded to iOS or Android devices, and then to the web, where the results can be monitored by the patient on a secure dashboard. "When

> **Glooko works with 29 different blood glucose meters, including devices from Lifescan, Freestyle and Roche.**

patients log in, they see only their own information," said Altinger. They can annotate the readings, leaving comments about readings, diet, exercise and insulin, and they can also print out reports.

Glooko exhibited at the HIMSS '14 conference, held in Orlando in February. The company's booth was located in the Samsung pavilion, where many of Samsung's partners were also exhibiting.

Earlier this year, Glooko announced it raised $7 million in venture funding, some of which was supplied by Samsung. Glooko Inc., of Palo Alto, Calif., was co-founded in 2010 by technologist Yogen Dalal, formerly of the Mayfield Fund and a one-time student of Internet pioneer Vint Cerf, who is now a vice president and chief Internet evangelist at Google.

The company introduced the technology to Canada in 2012 at a Vancouver conference sponsored by the Canadian Diabetes Association. Altinger said Glooko now has hundreds of users in Canada.

According to the Canadian Diabetes Association, the prevalence of diabetes in Canada has doubled since 2000, and is projected to affect nearly 11 percent of the population by the year 2020.

Many people with Type 2 diabetes can keep the disease under control through close management of medication, diet, exercise and logging their blood glucose levels through products such as Glooko, the company said.

At HIMSS, Glooko announced the release of software that provides population management with analytics and a graph-like interface. Called Glooko Population Tracker, the solution enables clinicians to

monitor large groups of diabetics and immediately see which individuals are at risk of becoming hypo or hyperglycemic.

Drilling down into the patient's record, the physician can see average blood glucose levels over various periods of time, as well as 'outliers', the BG results that are well outside the averages.

"The clinician can monitor the patient, and know what's happening, even before the patient comes into the office," said Altinger.

The doctor and patient can then work on the care plan, adjusting insulin levels and how the individual eats and exercises.

Close monitoring of a patient's glucose readings is a critical part of maintaining the health of at-risk individuals. However, Altinger said fewer than 10 percent of patient encounters include an analysis of their blood glucose records. "Few people do it, because it is so hard," he said.

Venture investors fueling surge in healthcare technology innovation

BY JERRY ZEIDENBERG

ORLANDO, FLA. – Healthcare used to be called the slowest industry to adopt new technologies, especially those of the electronic variety. Now, however, the sector is something of a Speedy Gonzalez, and is racing ahead of others – thanks to venture capitalists and investment bankers, the folks who are financing many of the innovations.

"For once, healthcare is taking the lead in technology," asserted Lucian Iancovici, investment manager for Qualcomm Ventures of San Diego, Calif., and keynote speaker at the Venture+ forum, part of the HIMSS '14 conference that was held in sunny Orlando in February.

"Every medical device is now being re-invented," said Iancovici, who was a New York-based medical doctor before joining Qualcomm Ventures.

Moreover, he noted the explosion of software apps in recent years, with more appearing each month. "There has been a 10-fold increase in apps in the last few years. Will there be a few big winners or a wide variety of successful apps? Nobody knows."

For its part, Qualcomm is a giant in the cell-phone industry, and since 2007 has been investing in startup companies that bring innovation to the healthcare sector. It has an investment fund of $100 million and, so far, has put money into 12 healthcare start-ups.

They include Fitbit, which has produced a wearable fitness tracker that uploads metrics to your smartphone and to the web; For

its part, Qualcomm invested a sizeable $43 million.

Iancovici said that in the three years from 2011 to 2013, US$4 billion was invested overall in healthcare technology startups in the United States. He expects that figure to soar to US$30 billion by 2019.

Qualcomm Ventures views six areas of healthcare as having the most potential for generating successful new technology businesses:

• Wellness. There is incredible opportunity in creating devices to promote health and to help consumers avoid becoming sick. Fitbit is a prime example, along with trackers of all sorts – for exercise, diet, sleep quality, and others.

• Chronic disease management. The healthcare system is having trouble dealing with an epidemic-like growth in diabetes, as well as cancer, hypertension, and other chronic illnesses. Solutions that tie patients to care-givers and help to keep their conditions under control are in demand.

• Re-admission reduction. Hospitals are trying various strategies for keeping patients well once they have been discharged, so they are not re-admitted.

• Aging in place. Another strategy for reducing the pressure on healthcare facilities is to help the aged stay healthy while still living at home. Various types of monitoring systems can assist.

• Clinical trials. Getting new medications into the marketplace faster, but with the correct testing beforehand, is a major challenge.

• Telemedicine. Physician shortages are

being experienced in rural areas of the United States and Canada, and sometimes in urban centres, too. Telemedical solutions are being developed to bring specialist care to regions that face shortages of skilled physicians.

Iancovici offered several examples of leading-edge devices that solve some of these quandaries.

A panel of investors addresses an audience at the HIMSS Venture+ forum.

• Cell-phone-based glucometers, which ease glucose testing and mean that patients never have to write anything down – all of the data is captured and logged by the phone. Results can be immediately sent to the doctor, who with the assistance of charting and analytics, can monitor many more patients than before.

• Diagnostics tests that are moving from inside the hospital or doctor's office and into the home. "There are EKGs available for $2,000," said Iancovici. "One with a single-lead attaches to a cell phone."

• New sensors that can be attached to cell phones, enabling point-of-care screening diagnostics. For example, a device that can measure electrolyte levels.

• Ambient intelligence, meaning systems that passively collect information, instead of requiring the patient or consumer to pump data into a device. Iancovici mentioned the example of a solution that monitors how often the elderly go to the bathroom – which could be an indication of a urinary tract infection.

There are plenty of problems to be solved, and many scientists and entrepreneurs are working on them and producing new technologies. However, Iancovici stressed that evidence will be key in validating the benefits of digital health solutions. "You have to build out studies in the way that healthcare professionals understand," he said.

Iancovici noted the Mayo Clinic did a study of Fitbit, to find out how well patients recovering from surgery did with the help of the tracking device. Just as importantly, companies have to show up front savings to the healthcare provider. "They don't want to hear that the solution will pay for itself in five years," he said. "They want to see immediate benefits."

According to Mercom Capital Group, a consulting firm based in Austin, Tex., the Top Five venture-capital funded companies in 2013 were:

• Evolent Health, a population health management services organization that integrates technology, tools and on-the-ground resources to support health systems in executing their population health and care transformation objectives. It raised $100 million.

• Practice Fusion, a web-based EMR provider, which raised $85 million in two deals.

• Fitbit, a fitness and health tracker company, which brought in $73 million in two deals.

• MedSynergies, a provider fo revenue and performance management solutions to healthcare providers, which raised $65 million.

• Proteus Digital Health, a provider of a digital health feedback system, which raised $45 million.

While there are large players making deals, there are hundreds and perhaps thousands of financings from smaller vencap funds, investment banks, angel investors, as well as loans from government and university-backed economic development agencies and incubators.

Katya Hancock, director of strategic partnerships with StartUp Health, an incubator and company that runs StartUp Health Insights, a healthcare vencap database, said the healthcare sector has "historically stifled innovation," but is now in a period of creative destruction. She noted that many industries are going through massive transformations – they include media, music, retail and commerce, and now healthcare.

According to Hancock, the biggest growth areas for healthcare technology are in 'patient engagement', meaning solutions that empower patients to take charge of their own health. Similarly, solutions for chronic disease management are also on the rise, she said.

Jewish General Hospital finds that surgical checklists have improved outcomes

The hospital was the first in Quebec to implement the World Health Organization's surgical checklist.

BY DANA FRANK

In its ongoing quest to improve patient care and provide top-of-the-line surgical services, the Jewish General Hospital (JGH) was the first hospital in Quebec and only the third in Canada to join the National Surgical Quality Improvement Program (NSQIP), in 2009. Soon after, the JGH was again first in Quebec to implement the World Health Organization's Surgical Safety Checklist.

Both NSQIP and the Checklist positively impact patient care and outcomes, identify areas to target for quality improvement, increase efficiency, and reduce costs that could then be re-invested in areas of clinical services and care.

NSQIP is an international program that compares a hospital's surgical outcomes to those in hundreds of other hospitals. Since some hospitals are larger and more specialized than the JGH while others are considerably smaller, all participating institutions send their data to NSQIP which uses a sophisticated statistical method of adjusting for differences between hospitals.

NSQIP then provides hospitals with the tools, reports, analysis and support to make informed decisions and monitor quality improvement initiatives. A risk-adjusted report is submitted to the JGH every three months, which provides information about where there remains room for improvement, and how the hospital is doing compared to others.

General Surgery, Colorectal Surgery and Vascular Surgery were the focus from the start at the JGH. Then recently, Orthopedics, Neurology and Urology were added. The intention has been to target more complex surgical areas that could potentially benefit from NSQIP.

"The hospital's membership in NSQIP shows our commitment to improving for the benefit of our patients, which is fantastic," says Anna Pevreal, head nurse for the operating rooms.

"It's a very humbling process, because you may learn you're not quite as good in some areas as you previously thought," explains Dr. Lawrence Rosenberg, executive director of the Jewish General. "The investment in our membership in NSQIP has already yielded impressive improvements in surgical services at the JGH.

Dr. Rosenberg was chief of surgical services when the JGH joined NSQIP and adopted the Checklist.

Surgical clinical nurse reviewers with a clinical background and unique NSQIP training coordinate the collection of data at the JGH. After submitting this data to NSQIP, the hospital receives benchmarked results on its performance. Once a trend is flagged, the JGH puts into place a multi-disciplinary task force to address and correct the issue.

"We're now looking at 60 cases per week," explains Gina Ciccotosto, JGH surgical clinical reviewer. "We review each patient's chart from one year prior to their surgery until 30 days after, which is unique. By calling patients at home and reviewing the surgeon's follow-up charts, we are now identifying complications such as infections after discharge."

Corrective action to reduce post-surgical complications often alleviates services across the institution. Since NSQIP was introduced at the JGH, it has become clear that it is not just a surgical improvement program; it has proven to be a hospital-wide improvement initiative.

There are reductions in patient length of stay, demand on resources, consultations and therapies such as medications and additional surgical procedures. When these hospital services are relieved by improving complications, the quality and safety of care are also improved and institutional costs come down.

"An added benefit of this post-surgical follow-up and of the improvements implemented is that it further promotes the patients' quality of life after their surgery," says Ms. Pevreal.

The JGH's Department of Surgical Services has gained a deeper understanding of where improvement is needed and has achieved substantial reductions in the rates of surgical site infections and post-surgical urinary tract infections since joining.

For example, the rate of surgical site infections among patients in colorectal surgery has continuously decreased since it was flagged in 2009. Also, since Orthopedic Surgery was brought in, NSQIP revealed a trend of over-reliance on transfusions. Thanks to that flag, another multidisciplinary team has come together to research protocols and best practices in order to address and correct the issue.

Today, there are over two million cases in the NSQIP's centralized and extensive database that can be accessed by member institutions for research purposes. As a member, the JGH can authorize any staff member to access cumulative data from other participating hospitals to conduct research and explore hypotheses.

"Accurate, ongoing measurement is essential to improving quality," says Dr. Rosenberg. "It ultimately reduces the overall cost of treatment and care, highlights weaknesses and offers a realistic understanding of how we compare to other hospitals."

"Ms. Ciccotosto adds, "Our goal is simply to gather the most reliable information possible to improve the quality of surgical care."

The pursuit and culture of improvement at the JGH is continuous. As such, Surgical Services opted to join the growing ranks of leading hospitals around the world in making systematic safety checks mandatory in all types of surgery. The Checklist is a quick, simple and inexpensive, yet remarkably effective means of reducing infection rates and lowering the number of medical complications and errors.

These procedures, which usually add no more than one or two minutes to the surgical process, ensure that the surgeon and other members of the team are familiar with the patient's health, and that every necessary precaution has been taken to protect the patient if something unexpected happens. Among the points covered are the patient's allergies; the availability of blood products in case of blood loss; the likelihood of complications; concerns, if any, by the anesthesia team; and the need for post operative antibiotics.

Everyone in the operating room is also required to identify themselves before the first incision is made. Research has shown that the simple act of stating one's name and job description makes each person feel like an active participant whose voice deserves to be heard.

"The process that comes along with using the Checklist promotes communication among the team and flattens the hierarchy of those in the OR," says Ms. Pevreal, who co-chairs the committee that introduced the Checklist. "Everyone gets an equal voice for the patient, which in the end, reduces the risk for error."

The JGH completed the last Accreditation Canada process in 2012 and was awarded Exemplary Standing. As such, the JGH met all compliance criteria for infection rates including tracking, analyzing and prevention. Additionally, all criteria were also met for the implementation of the Checklist.

The final Accreditation Canada report stated, "The JGH demonstrates a constant desire to be among the best healthcare institutions, first and foremost to provide patients with services of the highest quality. The institution never ceases to compare itself to others to keep an eye on best practices that could help them become more effective and more efficient."

"In the end, our team is able to celebrate our successes with these initiatives in place," says Ms. Pevreal. "We can now see progress and results, and we can be certain we are on the right track."

Dana Frank is Communications Coordinator for Special Projects at the Jewish General Hospital, in Montreal.

Dr. Lawrence Rosenberg

Gina Ciccotosto and Anna Pevreal, Head Nurse, Operating Room

How to improve organizational processes: Step 1: Get decision-making right

A series of studies of managerial decision-making showed that half of all organizational decisions fail.

BY RICHARD IRVING, PHD

In a series of columns I will discuss the steps to improving organizational processes. Let's begin with step 1: Getting the decision-making process right. In a series of studies of managerial decision-making, professor Paul Nutt showed that half of all organizational decisions fail. He concluded that the reasons for this surprising failure rate are lack of consultation and imposition of decisions, limiting the search for alternatives, and the use of power to implement plans.

By way of contrast, managers who tended to make successful decisions spent time to communicate the need for action, focused on a clear set of objectives rather than specific results, carried out an unrestricted search for alternatives and got key people to participate.

Perhaps the most underused technique is participation. Managers are often action-oriented and are consequently reluctant to spend the time to consult widely. However, according to Nutt, this is one action that can substantially increase the probability of a successful decision outcome.

Another key success activity is developing clear objectives to be achieved rather than focusing directly on problem solving. The difficulty with a direct problem solving focus has two aspects. First, it often leads to defensiveness and finger pointing.

Who is to blame for the problem? Second, it tends to unduly limit the search for alternatives. A focus on the objectives to be achieved, such as reducing operating costs, improving quality, etc., opens the search to a wider range of possibilities and increases the probability that a successful decision will be made and implemented.

Based on Nutt's conclusions and my own observations, here are several steps you can take to improve the decision-making process in your own organization.
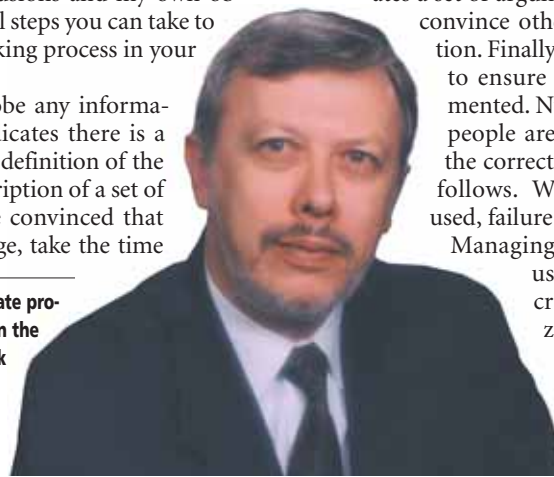
First, be careful to probe any information you receive that indicates there is a problem. Often the initial definition of the problem is actually a description of a set of symptoms. Once you are convinced that something needs to change, take the time

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to convince others of the need for change rather than imposing your solution. Once the need for action is established, define a set of clear objectives to be achieved and open the consultation process. While doing this, stress the need for idea creation and encourage people to think broadly about the problem.

As the decision process begins to narrow, insist that more than one option must be considered. This helps to avoid the problem of group think and creates a set of arguments which will be useful to convince others that this is the best option. Finally, you must engage politically to ensure that the decision is implemented. Nutt's results show that where people are engaged and convinced of the correctness of the decision, success follows. Where political coercion is used, failure often results.

Managing the decision processes you use is one of the first steps to creating a high-value organization. Good decision-making thrives in an open and supportive environment and withers in a blame and shame culture. The choice is yours.

After tests prove benefits, organizations adopt mobile solutions

BY BARRY BURK

A recent IDC study predicts that mobile workers will constitute 72 percent of the total workforce in 2015. In healthcare, however, that number is much higher. Doctors, nurses and healthcare workers need to be with their patients round-the-clock, not tied to a desk in front of a computer screen.

Healthcare in Canada has been feeling the pressures of growing expectations for better quality care. That coupled with increasing patient load, critical resource shortages and escalating costs results in strains on an already overloaded system.

With precious workforce resources stretched so thin, providers must be able to quickly contact a colleague, who may be anywhere on the floor or in the hospital. Often that means caregivers have to stop what they're doing, leave their patient to look for someone or place a phone call or a page – time that could make the difference between life and death in an emergency.

In such an overwhelming, fast-paced environment, it is possible for pagers, phones or overhead speakers to go unheard or unanswered leading to repeated attempts. This cre-

ates a chaotic environment where high noise levels add to the stress.

But the scene in Sherbooke, Quebec and more than 80 other facilities in Canada is different.

Le Centre de santé et de services sociaux – Institut universitaire de gériatrie de Sherbrooke (CSSS-IUGS) is a short and long-term geriatric care facility, serving the needs of 760 residents.

It recently equipped staff with Vocera hands-free, voice-operated wearable badges that provide instant two-way voice communication. The Star Trek-like devices make it easier for nurses and other healthcare professionals to connect, increasing staff productivity and improving patient care response time.

The badges allow caregivers to relay simple spoken commands between each other while they're tending to patients, and can also relay text messages and alerts.

Instead of responding to pagers or keying phones, a single voice prompt instantly connects staff to the caregiver they need, thereby reducing phone tag, overhead paging, or the need to physically search for a person. The system includes an optimized speech recognition engine which responds to more than 100 voice commands.

In Sherbrooke, the system was also customized to instantly alert staff when residents assigned to their care use their bedside call buttons.

Last year, the system was rolled out to cover almost all of the beds at the facilities; early trials in several wards have already seen a significant reduction in noise levels and improved response time to patients' calls. "The residents are calmer. As we spend less time moving around and are thereby more efficient, we end up spending more time with

> **A pilot project at KGH showed a 45 percent reduction in time spent looking for others.**

those for whom we care," says CSSS-IUGS spokesperson Jean-Claude Poirier.

Across Canada, we have worked with many healthcare facilities to install the Vocera communications system.

The University of Ottawa Heart Institute (UOHI) is the first Canadian hospital to integrate this system with a HIPAA-compliant smartphone application, which enables clinicians to use their personal mobile devices to text,

access and share clinical information and images on a secure database, without any confidential patient information becoming stored or resident on their personal device.

"This new system enables our teams to respond faster, ensures that our patients and their families benefit from the best care possible, and saves time and money on our system, " says Dr. Robert Roberts, president and CEO of UOHI.

Kingston General Hospital started with a pilot of the system on one of its surgical floors. As with any new initiative, it had to prove its usefulness and user-friendliness to be adopted and accepted. After all, nurses' routines and best practices tend to be well-developed over many years.

But when the pilot netted results, including a 45 percent reduction in time looking for others, a 61 percent reduction in time to respond to phone calls, a 54 percent reduction in time looking for assistance and a reduction in frequency to trips to a telephone from 6.8 times per shift down to 2.9 times per shift, the organization decided on a full-scale implementation.

Barry Burk is Vice-President, Healthcare Industry, with IBM Canada.

Avoiding delays in reporting results means patients discharged earlier

BY CRISTIN O'BRIEN

Every provider I talk with would love to improve the way they get patient test results. After placing an order, whether for a CT scan, a blood panel, or other test, many providers wait for hours to get the results. They often waste time periodically logging into the patient's electronic medical record (EMR) to check for updates or play phone tag with the Lab and Radiology departments.

Mobile devices are changing this process and generating significant time savings, both for providers and patients. A test results management application, integrated with the hospital's staff directory, can automatically send notices to the mobile device(s) of the appropriate clinician, letting him or her know when results are available.

This can mean faster treatment for patients, and potentially faster discharge. If findings are critical and indicate a life-threatening situation, this fast notification is especially important to cut out wasted time and improve clinical outcomes. A test results management solution works for incidental findings as well, such as a radiologist noting a suspicious looking lung nodule. The application can prompt a follow-up about the nodule later from the primary care physician.

Looking beyond test results, mobile and wireless devices help care providers work more efficiently when they need to get hold of one another. For example, if an in-patient needs more pain medication than the prescribed dosage, his or her nurse must contact the physician to get another prescription.

By linking the hospital's directory and staff mobile device(s) with intelligent software, the nurse can get a message to the correct physician right away. Perhaps a patient being treated for cancer develops cardiac complications and an on-call cardiologist needs to be consulted quickly. Adding on-call schedules and provider preferences to mobile device integrations means the right cardiologist is contacted swiftly to discuss treatment planning.

Another topic that comes to my mind is alarm fatigue, which has been getting a lot of attention lately. Pulse oximeters, heart monitors, ventilators, and even hospital beds are just a few of the devices that routinely monitor patients and trigger alarms when a patient's vitals venture outside the normal range. The reason these alarms are being talked about is because there are so many of them.

A study at Johns Hopkins estimates there are 350 alerts per patient bed, per day. Many of these are false positives, but the large volume of alarms means that important ones can be accidentally missed or responses could be delayed. Failure to quickly react to an actionable alert may cause patient harm and death.

Mobile devices and mHealth solutions can play an essential role in alarm management by routing alert details directly from monitors to clinicians for assessment and acknowledgement. In addition, these and related solutions also offer significant indirect benefits – audit trails, escalation options, and encryption of sensitive patient details.

I frequently hear that while providers and hospitals value the quick messaging capabilities of mobile workflows, some of the other features available with mHealth solutions are just as vital. Being software driven, mobile communications leave a digital trail that documents when every message is sent, received, and acknowledged. And, of course, digital communications can be encrypted to provide information security.

This is especially relevant in Ontario because of the Personal Health Information Privacy Act (PHIPA). Encrypting texts, images, and videos protects sensitive patient information from being unintentionally disclosed to someone who isn't supposed to see it.

Cristin O'Brien is Clinical Marketing Manager with Amcom Software.

- In the office

- In the field

- Smartphone

- Tablet

- Laptop

- Telephone

Connected Care across the Continuum

GoldCare's mHealth Solutions give your field staff connectivity and information when and where it's most needed: at the point-of-care. Our award-winning suite of software solutions efficiently manages the full continuum of care to ensure accurate and timely service delivery and maximize resources and workflow.

Moonlighting physicians are creating useful apps, as well as providing healthcare

Coming up with an idea is one thing, but turning it into a product takes time, effort and partnerships.

BY DIANNE DANIEL

In 2012, Dr. Joshua Landy, a busy intensive care specialist at Scarborough General Hospital in Toronto, was catching up with two friends over dinner. Today, the three are co-founders of Figure 1 Inc., a start-up that recently raised $2 million in seed funding to grow its healthcare photo sharing app.

Years ago, doctors Rahul Mehta and Aravind Ganesh became fast friends while first-year resident physicians at the University of Calgary, spending much of their post-call time chatting about challenges in their daily rotations. Now, they've partnered with software engineer Hisham Al-Shurafa to launch SnapDx, a mobile app that simplifies complex medical knowledge using infographics.

In today's world of smartphones and tablets, there's no shortage of ideas for developing mobile health apps. How is it that extremely busy physicians are achieving success?

Ask the founders of Figure 1 and SnapDx and they'll tell you serendipity was on their side, but it takes more than luck to bring an idea from idle conversation to fruition. You also need a strong desire to improve the way healthcare professionals work, a willingness to put in a ton of sweat equity, and the modesty to seek help when you need it.

At Figure 1, founded by Landy, mobile developer Richard Penner and Gregory Levey, an associate professor in Ryerson University's School of Professional Communication, in Toronto, the idea for an app was born after Landy spent a summer studying on-line approaches to medical education at Stanford University, in California. He took the age-old notion of a teaching file, essentially a file of interesting or perfectly classic cases that physicians collect over time, and applied it to the new world of digital media.

Rather than simply converting a paper-based process to an electronic one, he wanted to leverage on-line technology to offer improvements. "You need to invent a new process instead of just translating it into a digital one, the same way shopping for diapers on Amazon.com is different than shopping for diapers at a grocery store," he says. "People are taking these pictures with the objective of sharing and teaching in mind … there's no reason why anyone should keep a paper copy in a desk drawer where after a while, they don't get used."

Taking its name from the nomenclature used in textbook captions, Figure 1 is a secure app for sharing medical images that can be used as an interactive reference and teaching tool. A mobile, crowdsourced platform, it enables healthcare professionals to upload images from their smartphone or tablet, tag them, rate them for accuracy or search them, all in a manner that is in line with privacy and ethics requirements.

The goal is to take social behaviours – like checking a phone multiple times throughout the day – and convert those to professional behaviours, says Landy, and the concept is catching on. With tens of thousands of users in three countries, the app is currently available on iPhone and iPad with plans to expand to Android and desktop versions this year.

Reflecting back, Landy counts himself lucky that Penner and Levey had the technical and marketing know-how he was lacking. "I sort of thought I might end up as the guy with the idea who never did anything with it," he admits. "I didn't have any clue how to get started with something like this."

That's where business incubators and technology transfer offices come into play. Many universities and colleges across Canada have them in place. The intent is to serve as an accessible infrastructure to support entrepreneurs in the early stages of launching a product or service.

Within six weeks of that initial dinner meeting in 2012, Figure 1 co-founders had a working prototype. They pitched it to gain acceptance into Ryerson University's Digital Media Zone incubator and Ryerson

ILLUSTRATION: LINDA WEISS

Futures accelerator programs in Toronto, receiving crucial advice, support and investor backing in the early stages of their company's growth.

"Only about 15 percent of companies that apply end up getting into the DMZ," says Matt Saunders, president and managing director, Ryerson Futures Inc. "Of those who come in and start to gain traction, only a small percentage gain access to the accelerated futures program and potential funding."

Both programs look for "coachable" teams, he says, people who have some expertise or edge in their sector, and are attempting to solve a real-world problem.

"Very rarely do you find someone who has the technical skills to build the app, the marketing skills, background and insight to be able to go sell and market it, and the operational background to hire a team and grow and scale," he says. "Early on, when you can't afford all of those pieces, we help you scale faster and accelerate the development of your business."

From December 2012 to August 2013, DMZ provided office space to Figure 1, along with access to mentors and investors. In addition to arranging financial support from family and friends, the company has since announced $2 million in seed funding, co-led by Version One Ventures and Rho Accelerator Fund, and including a number of prominent angel investors.

Right now the company remains dependent on investor capital, but Landy remains optimistic that a revenue-generating model is within reach. It means Landy must continue to manage two jobs, working two weeks a month in the hospital's intensive care unit, and two weeks at the Figure 1 office, now relocated down the street from DMZ, but he says he loves both.

"For the time being they expect us to focus on building a very solid, likeable, useful, enjoyable and easy product," he says. "From our perspective we want to make sure it reaches as many healthcare providers as possible and provides the best or most educational experience as we possibly can."

Making money is not the first priority. What's more important is delivering a tool that makes a difference.

"We are not socialized as Canadians to be entrepreneurial in our health sector," says Anne Snowden, professor and chair at The University of Western Ontario's International Centre for Health Innovation, situated within the Richard Ivey School of Business.
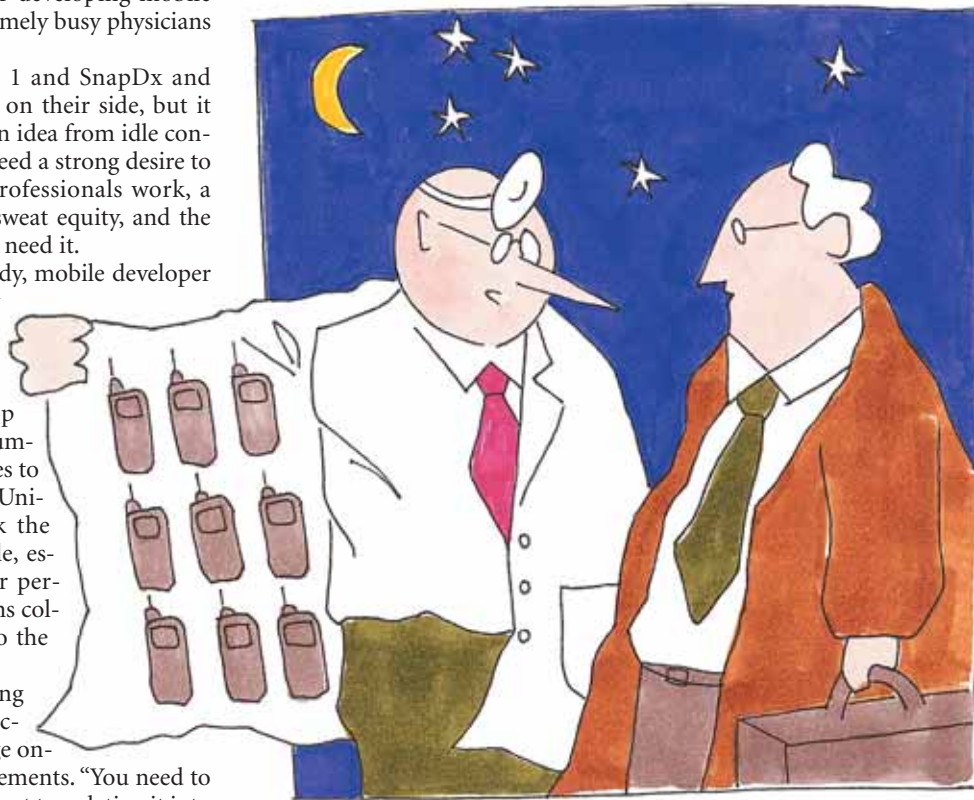
"We're socialized to achieve the best possible outcome for the people we care for … It wouldn't be surprising at all to me if they were to say, 'Look. This isn't going to make $1 million, that's not why I'm in it. I'm in because I think it's going to offer people some value," she says, referring to a growing group of clinicians-turned-app-developers.

From her vantage point at the Centre, where the mandate is to be a catalyst for healthcare innovation by supporting multi-disciplinary education and research, Snowden is seeing a growing number of ideas come forth for healthcare apps. One challenge facing clinicians who want to turn those ideas into products, she says, is learning how to juggle exhausting patient care commitments with the demands of a start-up.

"We are a country that is well-known for developing and coming up with very important and innovative ideas and new knowledge," she says. "But we are not a country that has a strong record in terms of getting those ideas or new products into our health system."

Both Figure 1 and SnapDx are on track to buck the trend. Like Figure 1, SnapDx has its first clinical assessment product available for the iPad and iPhones with plans to offer Android and on-line versions this year. The first version of the product targets the interaction between patients and doctors at point-of-care, providing doctors with quick access to evidence-based practices and knowledge and allowing them to generate pa-

tient-specific treatment plans that can be easily explained to patients using graphics.

Inspired by infographics he routinely read in The New York Times, Mehta wanted to take the concept of simplifying complex data and adapt it to the medical community. "We started punting ideas back and forth and this model started to come together," says Ganesh, adding that the ultimate goal is to transform the patient-doctor visit.

Knowing they needed the help of a software engineer, the two approached Al-Shurafa who was enjoying early success developing software tools for plastic surgeons as co-founder of Startup Calgary. They were simply looking for a recommendation. Instead, Al-Shurafa came onboard and the three struck a friendship.

For now, the SnapDx co-founders work out of a travelling office, meeting wherever and whenever it's convenient. It might be Second Cup or Starbucks or somebody's home, and they average 10-15 hours of office time per week, or roughly one hour for every three hours Mehta and Ganesh spend performing clinical duties.

In 2013, SnapDx beat out 13 other healthcare start-ups to win first place at the W21C Innovation Academy at the University of Calgary, earning a $10,000 cash prize. Beyond that, they've been working on "sweat equity" and have yet to look for external sources of financing. The goal is to have a strong, working beta product before they "start playing with other people's money," says Ganesh.

In the meantime, the team is tapping into available resources at the University of Calgary and is looking to partner with associations and groups that produce evidence-based knowledge. It also intends to join an incubator program, either in the U.S. or Canada.

"The great thing about knowledge is that facts can't be patented," says Ganesh. "One of the passions we share, in addition to trying to improve the quality of healthcare, is also trying to improve the equality of access to information. As we're looking at big academic centres like university hospitals compared to the average family practice or community hospital, there's a big gap in the knowledge that can be accessed."

Ganesh believes one reason for the success of SnapDx to date, including its overwhelming acceptance at W21C Innovation Academy, is that it is strongly rooted in clinical experience and driven by the need to solve challenges. "What we found is that it doesn't really matter how knowledgeable you are about different conditions or how up to date you are on the literature, when it actually comes down to the point-of-care, your brain falls back on more simplistic models for trying to figure out how you want to manage a problem," he explains.

SnapDx solves the problem of information overload, allowing doctors to rely on more than just their memories and giving them a visual way to present data to patients. For example, the side effect visualization tool uses a grid diagram of coloured boxes to depict possible side effects, correlating the sizes of the boxes to the likelihood of a patient developing that particular side effect.

This year, SnapDx is teaming with a group of students from University of Cal-

gary's Haskayne School of Business to participate in the Clinton Global Initiative's 2014 Hult Prize President's Challenge. Teams are being asked to build sustainable and scalable social enterprises to address non-communicable diseases in urban slums. The idea is to develop a creative solution that can change the way medicine is practiced in the developing world.

"The students were thinking of some way to incorporate telecommunications into their solution," says Ganesh. "Our solution was born in a North American environment, but perhaps its biggest calling will be in the developing world, in places where people don't have the hope of accessing high-end technology and everything rests on the patient-physician interaction."

Such altruistic or selfless goals are common among physician entrepreneurs, says Snowden. Faced with increasing and significant demands for care from the populations they serve, it's natural the number one priority is to create an app that makes their work life better or more efficient. Apps are exploding in the mainstream consumer world as useful tools to help navigate, manage and organize effectively so it's just a matter of time before healthcare gets there too, she says.

Mobile health apps for the patient-consumer: where the real action is

JOSEPH CAFAZZO, PHD, PENG

It's inevitable that the next generation of IT products for healthcare providers will be mobile-based. The convenience and utility of access to information at the point-of-care that mobile health apps provide will continue to drive the demand.

But the real excitement in mobile health apps is to be found in the patient-consumer space. This includes those who are well, the informal care provider (mom!), and of course, the patients themselves. It's an area where significant innovation can take place, as patient-consumers have been under-appreciated, under-utilized, and just plain ignored by the healthcare system and technology companies.

With face-to-face encounters between healthcare providers and patients becoming shorter, less frequent, and more expensive with each passing year, we're discovering the near-ubiquitous smartphone is becoming a channel to reach those who are seeking greater involvement in their own care, or the care of someone they are responsible for.

This notion of patient self-care is not new. What is new, however, is the ability to deliver it in a way that is simpler and more convenient than ever before. Through one's phone it's possible to create a channel for accessing information, tools, and more timely communication with providers.

The Next Wave: With the rise of patient self-care, where can the next wave of technology innovations take us? Our teams at the Centre for Global eHealth Innovation have been busy developing the next generation of mobile health apps, focused on ensuring that we truly improve the health of the patient.

In our approach, we do what most others don't; we use rigorous evidence to inform our design. It's expensive, time-consuming and often really hard, but conducting clinical trials and using existing published science is necessary in this space.

Unlike other parts of the consumer marketplace, there is an expectation in healthcare that any claim of what your technology will do needs to be supported by evidence. At a minimum, you need to show it will not harm the most vulnerable.

Unfortunately, the developers of the first generation of mobile health apps didn't necessarily share this view, and released countless apps that did little more than replace paper and pen, substitute for a Google search, or simply made false claims. With regulators now well-aware of mobile health apps, guidance and notices have been published, so the ground rules have been set.

An app for chronic illness: Being based at Toronto General Hospital, we're particularly aware of the effects of chronic illness on the healthcare system. Too often, we witness congested emergency departments and in-patient beds that are used for conditions that shouldn't require an acute-care setting. For this reason, it's no surprise that we turned our focus to the most prevalent chronic conditions when designing apps.

Our latest is Medly, a play on words whereby the app is designed to deal with patients with multiple chronic conditions. It brings together nearly a decade of research that we've conducted on the use of mobile phones for tackling serious chronic conditions.

We learned that patients with uncontrolled high blood pressure (BP), could self-manage their condition with the use of a Bluetooth-enabled BP monitor coupled with our app. Reminders to take readings rang their home phone; it was a little annoying until patients realized their importance.

Serious trends were identified to both patient and provider. After a year, the cohort using the app showed a dramatic improvement: a 20 percent reduction in their risk of heart attack and stroke, while the cohort with usual care showed no change. Incredibly, it didn't result in more medications and more doctor visits, the fear from the beginning.

This was truly patient self-care, where patients were doing the heavy lifting, and not their overwhelmed providers. Further work showed that the technology could be used for heart failure patients, who are often some of the sickest patients we see. By

With apps, patients become more active in their healthcare.

adding a weight scale and some targeted questions around symptoms, we showed that these patients could be more tightly managed, with improved health outcomes and improvements in their ability to care for themselves.

Medly is a modern redesign of the system used in this research. By adding the ability to deal with COPD and CKD patients, we've further rounded out its ability to deal with the sickest patients, as well as patients who often have more than one condition.

An app for diabetes: One of our most popular apps has been bant – named after Frederick Banting, who first tested insulin just steps away from where we develop our apps at Toronto General. It is one of the first mobile health apps released for the management of diabetes, and it has been used by tens of thousands of people around the world.

A pilot at SickKids in Toronto last year showed that teenagers tested 50 percent more frequently using bant than before they used the app. A combination of a friendly design and some novel features encouraged them to test more often.

bant integrates the notion of social media into diabetes management, so that users could connect with teens like themselves. It also rewarded them for positive behaviors – for example, tracking their glucose levels through the automated transfer of blood sugar readings. By gamifying this task, they earned points for their efforts, eventually accumulating enough to earn iTunes gift codes, which could be redeemed for music, movies, or apps.

This year, a more advanced version of bant is being tested with a larger group at SickKids and Trillium Health Partners. The project aims to show if the app could bring down a teen's A1c level.

As well, a new version of bant that more closely targets the management of Type 2 diabetes will be released and trialed. It will focus on certain lifestyle aspects that are a problem for this group. The ability to track activity levels will be added through use of popular devices such as the Fitbit and Jawbone Up.

A simpler way of tracking diet will be added, without resorting to completing a dreary food diary. Finally, bant will enter the Android ecosystem later this year, where the demand on this popular platform has been high ever since our first iPhone-only release.

Joseph Cafazzo is Lead for Centre for Global eHealth Innovation at the University Health Network and Executive Director of Healthcare Human Factors. He is an Associate Professor of Health Informatics and Clinical Engineering at the University of Toronto.

How smartphones can help you keep your healthy 2014 resolutions

BY SCOTT R. HERRMANN

It seems that every year, we start with the best intentions to stay fit, eat healthier and maintain healthy life style choices throughout the year. According to the University of Scranton, Journal of Clinical Psychology, losing weight and getting fit both were in the top five New Year resolutions. But how long will our goals to a healthier life last? The same study stated that 45 percent of Americans made New Year's resolutions, however only 46 percent actually maintained these resolutions past six months.

So what do we need? What we are finding is that modern technology, combined with people becoming more engaged with their own health, is making it easier to meet fitness goals. For example, fitness trackers have the ability to give insight on how you sleep, move and eat. This is a significant evolution over the standard pedometer, which only measures the quantity of steps you take in a day.

Now, this may seem like an odd article to come from me, the leader of mobile solutions for a home care company. But bear with me, as I have a point.

As the popularity of fitness trackers continue to grow, so does the opportunity to create similar fitness tracking applications for smartphones. New research has found that workers who exercise are able to manage their stress levels better, which increases their efficiency and effectiveness at work and at home.

Russell Clayton of Saint Leo University's Donald R. Tapia School of Business, in the Harvard Business Review, states, "while exercise may seem like one more task to add to an already busy workday, it decreases stress, and a reduction in stress is tantamount to an expansion of time."

So how can we leverage the use of fitness tracking applications to maintain their fitness and health goals? Can fitness trackers help us to be better engaged with our physicians through the constant health feedback we receive

when we upload information? And more importantly, how will this lead to lower costs of healthcare?

Allow me to explain how this works: fitness trackers have the ability to provide that extra level of motivation to encourage you to make health-conscious decisions throughout the day. For example, I chose to monitor my fitness and health goals using a mobile application. My goal for 2014 is to walk 500 miles this year. Does that sound overly ambitious? Absolutely not; by walking the dog daily and hiking each weekend, I will be able to achieve this goal. Each day I am able to sync my activity with my computer and compare my results to the previous days, allowing me to stay

Scott R. Herrmann

competitive with myself, pushing me to try harder.

At Procura our goal is to provide technology that ensures care all the way to the hospital door. Monitoring daily activity and food intake is what we call preventative healthcare, or pre-acute care. By engaging patients in their health, we can focus on lowering healthcare costs through reduced readmission and increased health self-awareness, by diminishing entering the hospital in the first place.

Like many other years of resolutions left unfinished, good intentions without execution won't lead to better results. It is still up to us as individuals to make ourselves want to stay healthy and fitness trackers are one way to stay inspired. Yet we are part of a massive continuum, no longer looking after our own health, but also the health and wellbeing of our neighbours, friends and family.

Scott R. Herrmann is Director of Mobile Solutions at Procura. www.goprocura.com

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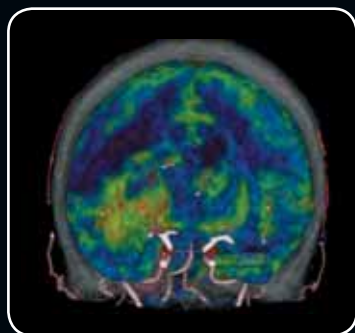
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