

# FUTURE OF HEALTH CARE

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## The Future of Health Care Focuses on Empowerment through Knowledge

Canada is at the crossroads in terms of how it handles the health of its citizens. An aging population, advances in technology, and a desire to be more proactive with care are helping to shape the future of health care. There's great potential for these advancements to create a positive impact on the lives of Canadians.

### Playing an active role

Dr. Brian Goldman, a physician at the Schwartz/Reisman Emergency Centre at Toronto's Mount Sinai Hospital, is seeing big shifts coming. "Many patients take a passive approach to their health care," he says. "We think it has nothing to do with us and everything to do with what a doctor says and does. That's not true."

While you can't alter your genetics, you can embrace good lifestyle habits. "Many people don't understand how much health outcomes stem from smoking, alcohol, and the consumption of too much salt and refined sugar. Making small changes early in life has a huge impact on one's future health."

Embracing knowledge is part of a growing movement toward health literacy, a basic understanding of what shapes health. Fortunately, with the wealth of information available, being well informed has never been easier. Dr. Goldman, also host of CBC Radio's *White Coat, Black Art*, and the author of *The Secret Language of Doctors*, recommends referring to credible sources, like the Public Health Agency of Canada, Canadian Institute of Health Information, or the Mayo Clinic.

### Our aging population

As the median age of Canadians increases, the shift to patient empowerment is timely. Seniors are especially poised to reap the benefits. Michael Green, President and CEO of Canada Health Inflow, says advances in digital health have opened up new models of care — making it possible for more seniors living with chronic conditions to be cared for at home.



**Dr. Brian Goldman.**  
ER Doctor, Radio  
Host & Health Care  
Pundit

*The Secret Language of Doctors* is Dr. Brian Goldman's bestselling book packed with gripping stories that reveal a side of doctors you've never seen before.

"The use of in-home digital health equipment provides seniors with the peace of mind of knowing their conditions are monitored by health care professionals who can intervene before serious complications arise," he says. "Patients are reporting very high levels of satisfaction as a result of being in the program."

Green also recognizes technology's ability to boost patient confidence. "It has made it possible for patients to be more proactive members of their own care teams by providing them with access to their health information," adds Green. "Ninety-five percent of respondents of a recent Inflow survey of patients who have access to their health information said they feel more confident taking care of their health."

### Changing roles

Dr. Goldman foresees the role of physicians changing. "You don't need a doctor for every situation every time," he says. "We're seeing more nurse practitioners, physician assistants, and pharmacists managing chronic morbidities like diabetes and heart disease. Health coaches providing peer-to-peer counselling encourage patients to develop and adopt healthy lifestyles."

As he points out, "You don't want to be like a piece of driftwood, just floating in the water, going wherever the current takes you. It's important to be empowered and be your own health care advocate." ●

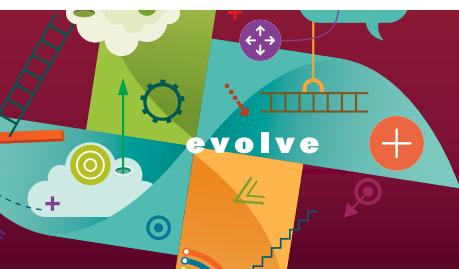
Michele Sponagle

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# Is Value-Based Health Care the Future for Canada's Ailing System?

Canada's health care system is lagging behind its counterparts but adopting a value-based framework could eradicate inefficiencies and improve patient outcomes.



nce touted as exemplary, Canada's health care system has, in recent years, begun to trail behind its similarly developed peers. Results from the Commonwealth Fund's most re-

cent report prove what many health care leaders and policy makers have long known: Canada's health care system scores below average on many key indicators.

The Canadian government spends approximately \$150-billion a year on its health care system leading many observers to contend the system's inefficiencies are not down to a dearth of funding, rather that a silo mentality has developed due to a lack of integrated administration, care pathways, and funding envelopes.

## A fragmented system

The key to unifying a compartmentalized health care system may lie in implementing a value-based health care framework, the goal of which is to lower costs and improve quality and outcomes.

"At the moment, it's all about incidents of care, it's not about the patient's journey and I think that's the problem with the way our health care system is set up,"



**Canada's health care system scores below average on many key indicators.**

Source: The Commonwealth Fund

says Neil D. Fraser, member of the Federal Advisory Panel for Health Care Innovation.

In a health care system run on a value-based model, a patient's journey from diagnosis to recovery becomes one complete unit and all costs associated with their journey are bundled together. This model would essentially break down the silos in today's system and because it is an outcomes-based approach, it puts patients' well-beings front and centre.

A switch to value-based health care would require restructuring how health care is delivered, measured, and reimbursed. The health care technology sector will have a role to play with integrated pathway solutions.

## The best outcomes at the best value

A number of innovative technologies that can save lives at a lower overall cost already exist but due to the frac-

tured funding mechanism in Canada's health sector, they are not always widely embraced.

A good example of this issue is the neurovascular stent retriever, which the Cleveland Clinic recently named one of the top 10 medical innovations of the year. Inserted into the body through the groin and woven up to the brain, the stent retriever can seize a blood clot present during ischemic stroke, remove it and — when used in tandem with clot-busting drugs — can save lives.

While the stent retriever provides a relatively high upfront cost within one department, it can cut costs for other departments downstream due to reduced treatment and rehabilitation. The problem, however, is that hospitals are not able to translate savings interdepartmentally due to siloed budgets. Value-based health care would accumulate all costs along a patient's journey and could easily translate savings to offset increased costs in one area.

"I think a value-based health care system is an opportunity to deliver the best value and the best outcomes," says Fraser. "How can you argue with that?"

Bronwen Keyes-Bevan

# Next-Gen Seniors Catalyst for a Healthier Canada

According to the World Health Organization, the number of individuals aged 65 and over is expected to triple in the next 30 years. Clearly this will present significant challenges to governments and health care systems around the world as they aim to sustain our seniors. Within the ramifications of this *grey tsunami* three main challenges are emerging:

- 1 Advances in medical technology mean that conditions, like heart failure, are manageable as chronic conditions.
- 2 Informal caregivers such as family and friends will be called upon more often to provide health care and related support services to their loved ones.
- 3 Individuals will want to age with grace and dignity, remain socially connected and supported while staying in their own home.

## Aging 3.0

Seniors are more socially connected than ever with the interest and financial stability to become even more tech-savvy. The retail market has played into this trend by launching products that appeal to seniors and their unique needs. They enable self-health management and connect seniors to their informal circle of care — friends and family members.

These technologies also allow for better care at home and at the community level and the future has a lot of promise. Innovations such as passive activity sensors, for instance, allows seniors to live at home while tracking location and sending alerts in case of a fall or medical emergency.

Remote patient monitoring, which uses tele/video health and connected devices, like digital blood pressure cuffs for example, empowers seniors to have better self-care and fosters a deeper connection with health care providers from their very own home. Remote monitoring can also reduce the progression of chronic disease and allow for intervention before an acute health event occurs.

## Beyond the health care system

Currently, there's no one holistic approach to meeting the needs of seniors with a set of integrated end-to-

end services. This is surprising considering the significant opportunity that exists to alleviate the pressure on our burgeoning health care system by connecting patients with doctors and other health care providers like pharmacists to encourage a culture of healthy aging.

## A healthier future with a dose of technology

Technology, apps, and connectivity play a critical role in keeping people engaged both socially and from a health perspective. But, integration of these technologies is key for creating healthier and happier Canadians — regardless of age.

Hélène Chartier

Supporting Partner

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*Genetic Insight as a Foundation for Wellness*



**Suzanne\*, a Toronto professional, sought help in managing her anxiety and depression. Working with a psychologist at Medcan, she was able to adopt new coping skills through cognitive behavioural therapy. The other area that needed to be addressed was the suitability of her current medication.**

She opted for pharmacogenomic testing, a specialized genetic test, to pinpoint which drugs would work for her and which would not. Suzanne learned she was a fast metabolizer of the drug she had been prescribed. Her body processed it so quickly she was not getting the full benefit of the medication.

Armed with this information and suggestions for alternative medications that she could metabolize more effectively, she was able to talk to her psychiatrist about changing her prescription. When she switched to a new drug, her anxiety and depression symptoms subsided, thanks to the data she received through testing.

“Without genetic testing, there can be a lot of trial and error when it comes to finding the right medication,” explains Jill Davies, Director, Genetics at Medcan. “Someone seeking treatment for anxiety or depression tries on average four different drugs before getting the right one.”

Pharmacogenomic testing removes the guesswork and predicts likely results, even potential side effects of a drug. It’s a powerful new tool for patients looking for the best possible health outcomes. ●

*Michele Sponagle*

# Canadians Take Control of Their Health with Insight and Inspiration

Many Canadians will say that being healthy means being disease free. However, when wellness experts tell us it's more about living the best life possible, it's hard to disagree. Getting to your best life means eating right, getting regular exercise, and nixing bad habits, like not getting enough sleep. But, when overall wellness is a goal, knowing what to do is not enough.

## Health experts provide inspiration and guidance

This collaborative approach is crucial for success in adopting new behaviours, because creating change is difficult. Medcan offers a range of experts, from physicians and dietitians to fitness trainers, to help clients tackle obstacles they face and achieve their goals. Ongoing support is another key. Regular check-ins mean sustained accountability and opportunities for coaches to make any adjustments needed for a plan to work with the realities of life.

For example, the Medcan weight management program goes well beyond just what to eat.

A physician with expertise in behavioural therapy works with clients on achieving the mindset needed to commit to a healthy lifestyle, which not only includes eating the right amount, but also adopting positive behaviours such as better stress management and sleeping well. The physician alongside a dietitian, who brings nutrition science knowledge to the table, works with individuals to customize an approach that works best for them, staying with them a full year to ensure new life skills are learned and better outcomes are reached. ●

*Michele Sponagle*

Supporting Partner



**A**chieving wellness is about knowing how to create new habits, including how to tackle the inevitable roadblocks that prevent healthier habits from sticking. This is where having a collaborative approach with health care professionals comes in. Canadians don't have to navigate the road to being healthy alone.

Medcan, a Toronto-based health and wellness company, helps clients make healthy lifestyle changes. To get your health where you want it to be, it's important to first find out where you're starting from. The Medcan approach starts with delving deep to get a complete picture of an individual's health status. Information is gathered through a head-to-toe physical assessment, as well as specialized tests such as genetic testing to uncover susceptibility to certain diseases.

## Personalized health insights translate into goals

Health care professionals at Medcan partner with clients to turn this knowledge into an action plan for managing their specific health risk factors and creating positive lifestyle changes. While nothing can be done to change one's genetics, we have the ability to modify our behaviour and address the risks we're either born with or have created through unhealthy habits.

“It is about empowerment,” says Shaun Francis, CEO, Medcan. “People like to be in control of their health and we can help them achieve better outcomes.”

**“It is about empowerment. People like to be in control of their health and we can help them achieve better outcomes.”**  
— Shaun Francis, CEO, Medcan

\*Actual name withheld

# Technology Offers Less Invasive Alternative for Those at Risk of Sudden Cardiac Arrest

Innovations in implantable defibrillator technology can save lives with fewer drawbacks than traditional implantable defibrillator systems.

In 2009, ex-professional basketball player Brian Brunson was halfway through a game when he started to feel dizzy. The next thing he remembers is waking up to a sea of concerned faces.

Unbeknownst to him, Brunson, who was newly married and had a baby on the way, had suffered a sudden cardiac arrest — collapsing while playing. He would have died on the court that day had it not been for the presence of an automated external defibrillator (AED). With the aid of the AED, Brunson was brought back within two and a half minutes.

“There’s a 95 percent mortality rate and within that 5 percent that survive, only 2 percent survive without any brain damage,” says Brunson. “I was pretty lucky.”

Brunson subsequently had a device implanted into his body that could detect and correct any future problems with dangerous heart rhythms, the root cause of the cardiac arrest. This device, known as a transvenous implantable cardioverter defibrillator (ICD), has wires that weave through the veins and into the heart. An implantable defibrillator acts like an insurance policy against future occurrences of sudden cardiac arrest.

Transvenous ICDs have saved countless lives but they have drawbacks. The wires are under tremendous physical stress related to lead movement in the hostile environment of the beating heart. In the worst case scenario, transvenous leads will fail to properly function at a rate of about two percent per year. This fail rate means patients will need to undergo further procedures

and face the risks associated with such interventions.

In Brunson’s case, his device’s battery reached its expected lifespan and he underwent a replacement procedure. Two weeks after the replacement, Dr. Glen L. Sumner, Clinical Assistant Professor of Medicine at University of Calgary’s Libin Cardiovascular Institute of Alberta, identified a potentially life-threatening infection which required hospitalization and removal of both the wires inside the heart using a surgical laser, as well as removing the new generator. After careful review of the options, the cardiac device physicians at the Libin Institute decided to implant a newer kind of defibrillator.

### Innovations in technology

The subcutaneous implantable cardioverter defibrillator (S-ICD) is similar to the transvenous ICD in that it is implanted in the body and can detect a dangerous heart

rhythm and use an electrical shock to reset the heart rate, but there are some major differences between the two.

The subcutaneous device — literally meaning under the skin — is implanted beneath the chest wall. The S-ICD can, like its transvenous counterpart, act as an insurance policy against sudden cardiac arrest but there’s likely a significantly lower risk of serious bloodstream infections or damage to the veins or heart that may occur with the transvenous ICD. The lower complication rate is because the S-ICD wire is not inside the veins and heart but instead underneath the skin. The device is also easier to implant meaning a potentially lower risk procedure. In addition, the subcutaneous lead is not subject to the same hostile environment and movement as the transvenous

leads and therefore may have significantly less chance of failure over the long-term.

Although it’s too early to say, early findings seem to suggest subcutaneous systems will require significantly less system revisions than transvenous systems — for example, addressing damaged wires.

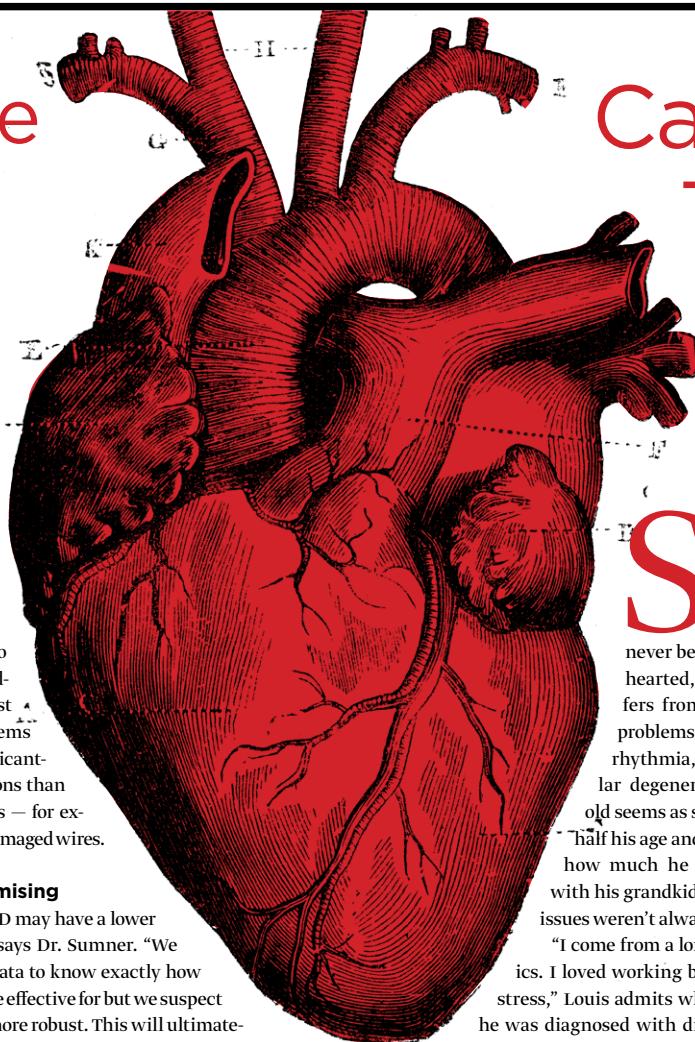
### The future is promising

“We believe the S-ICD may have a lower complication rate,” says Dr. Sumner. “We don’t have enough data to know exactly how long the wires will be effective for but we suspect that they’ll be a lot more robust. This will ultimately be determined by long-term outcome studies and device registries but right now it looks very promising.”

Brunson had an S-ICD device implanted just over a month ago. “It was hard after the procedure because I couldn’t pick up my one-year-old son,” he says. “I’m 6’9” and my wife’s almost six foot so the baby is huge! But, I’m in good health and good spirits and I like the fact that I don’t have any wires in my heart anymore. If this got infected, they could just take it out, treat it and put it in again. And, with the traditional ICD those wires decay but with this S-ICD, one wire could potentially stay in your whole lifetime.”

Brunson, who lives in Calgary with his wife and three children, is recovering well and has just been cleared for heavy lifting. ●

Bronwen Keyes-Bevan



# Cardiac Patients Who Can’t Tolerate Blood Thinners Have New Hope

Irregular heart rhythm can impact the lives of young and old alike, from superstar athletes like Mario Lemieux to everyday Canadians looking forward to their summer vacations.

Spend just five minutes in the company of Louis Ferguson and you would never believe that this light-hearted, energetic man suffers from numerous health problems, including heart arrhythmia, diabetes, and macular degeneration. The 72-year-old seems as spry as a man nearly half his age and speaks often about how much he enjoys keeping up with his grandkids. But, Louis’ health issues weren’t always this manageable. “I come from a long line of workaholics. I loved working but it caused a lot of stress,” Louis admits when describing how he was diagnosed with diabetes in 1991. The disease didn’t slow him down though and he continued to travel the globe, working a wide range of jobs, including a university lecturer and a researcher.

Sadly, his health deteriorated severely in 2012, so much so Louis had to retire. His immune system was severely compromised and he became very ill. “I was incredibly fatigued all of the time and I kept getting all these flu and cold symptoms,” he explains. Louis underwent a battery of tests. “The tests revealed that many of my problems, like fatigue, shortness of breath, recurrent lack of energy, were probably due to cardiac problems like an irregular heartbeat. It became evident that I was a prime candidate for a stroke.”

In response to his cardiac problems, Louis’ doctors put him on Warfarin, a commonly used blood thinner. Unfortunately, Louis did not respond well to

the medication and had severe side-effects like headaches and it would also cause blood vessels in his eyes to burst and bleed. “It was terrible,” says Louis. “I could not drive or fly on trips anymore and I was so tired all the time. I had to set aside a lot of activities and sleep more. Until I got sick, I had never had a nap in my life!”

Due to the negative side-effects Louis experienced on blood thinners, it was clear something else had to be done. So, his cardiac doctor referred him to Dr. Réda Ibrahim, an interventional cardiologist at the Montréal Heart Institute. Doctor Ibrahim decided that Louis was the ideal patient for the Watchman Left Atrial Appendage Closure device.

**“It became evident that I was a prime candidate for a stroke.”**

### Finding the right treatment

“They told me they were putting an umbrella into my heart!” says Louis. The Watchman, which does in fact bear a striking resemblance to a miniature umbrella, is about the size of a quarter. It’s implanted into the left atrium of the heart and significantly reduces the risk of strokes by preventing

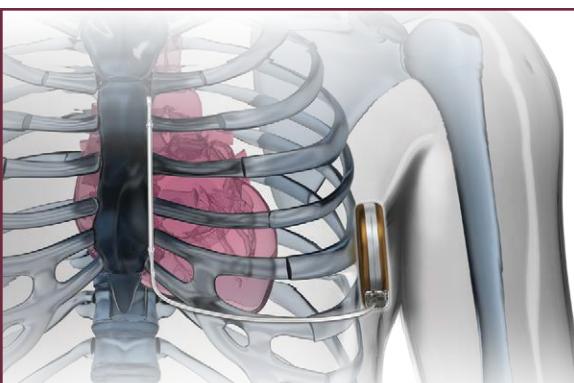
blood clots from travelling to other parts of the body like the brain or lungs. “The Watchman LAAC implant is a medical device designed to occlude the appendix, a small finger-like cavity attached to the superior part of the heart [atrium],” describes Dr. Ibrahim. “[This atrium]...tends to cause

medical problems, such as clot formations in the heart. Clots tend to form in the appendix because it’s a dead space with stagnant blood (in patients with heart rhythm disturbances) causing poor and unsynchronized contractions. Dislodgment and migration of the clot is a catastrophic event and causes strokes most of the time.”

The procedure for this one-time implant takes only about an hour and is ideal for patients who have irregular heartbeats but can’t tolerate blood thinner medication. “Louis was a good candidate because he suffers from atrial fibrillation. His condition was at high risk of a cardio-embolic stroke,” explains Dr. Ibrahim. “Atrial fibrillation is a very common condition affecting at least 1 percent of the population and nearly 10 percent after the age of 80 years. It’s the number one cause of stroke.”

In September of last year, Louis received the implant. “It took a few months to recover but I now have lots of stamina and energy,” says Louis. “I am very happy with the results. I would strongly recommend it. It has given me a whole new perspective on life!”

Sandra MacGregor



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**Boston Scientific**

# Medical Technology Company Brings Remote Monitoring of Pacemakers into the 21st Century

There are approximately three million people with cardiac pacemakers worldwide, with a further 600,000 being implanted each year.

**T**hough pacemakers have been around for nearly five decades, they were actually one of the first implanted medical devices capable of transmitting data from its users' homes. This was accomplished via analog telephone lines and was initially only able to send rudimentary information, such as battery status. Then, just over ten years ago, second generation pacemakers were introduced that had the ability to relay more information, including historical data and device diagnostic information. A wand would have to be passed over the pacemaker device to take and transmit readings.

Even still, sending data from these more advanced pacemakers could be inconvenient. For example, these second-gen devices were limited to monitoring via an analog telephone line within continental North America only.

Although there have been significant medical technology advancements in the last decade, a novel solution to the challenge of pacemaker remote monitoring is an inherently non-medical device: the smartphone. It's strange to think our smartphones, the tool we

use for almost all aspects of our lives, were non-existent just ten years ago; now they're almost ubiquitous. In 2015, comScore estimated more than 62 percent of Canadian phone owners, 55 years and older, owned a smartphone and more than 1.5-million Canadians used mobile devices exclusively to access the internet.

This knowledge, coupled with the limitations of previous pacemaker monitoring, inspired Medtronic, the world's largest standalone medical technology company, to utilize smartphones as a way to remotely monitor their patients' pacemakers. This innovative pairing of commercial and cardiac medical technology optimizes health-care in a number of different ways.

Applications like the MyCareLink Smart™ Monitor for Medtronic implantable pacemakers, for example, allows patients to use their own Apple or Android smartphone with the MyCareLink Smart app to transmit data to their physician or other caregiver over the internet or cellular network. This exchange not only elimin-

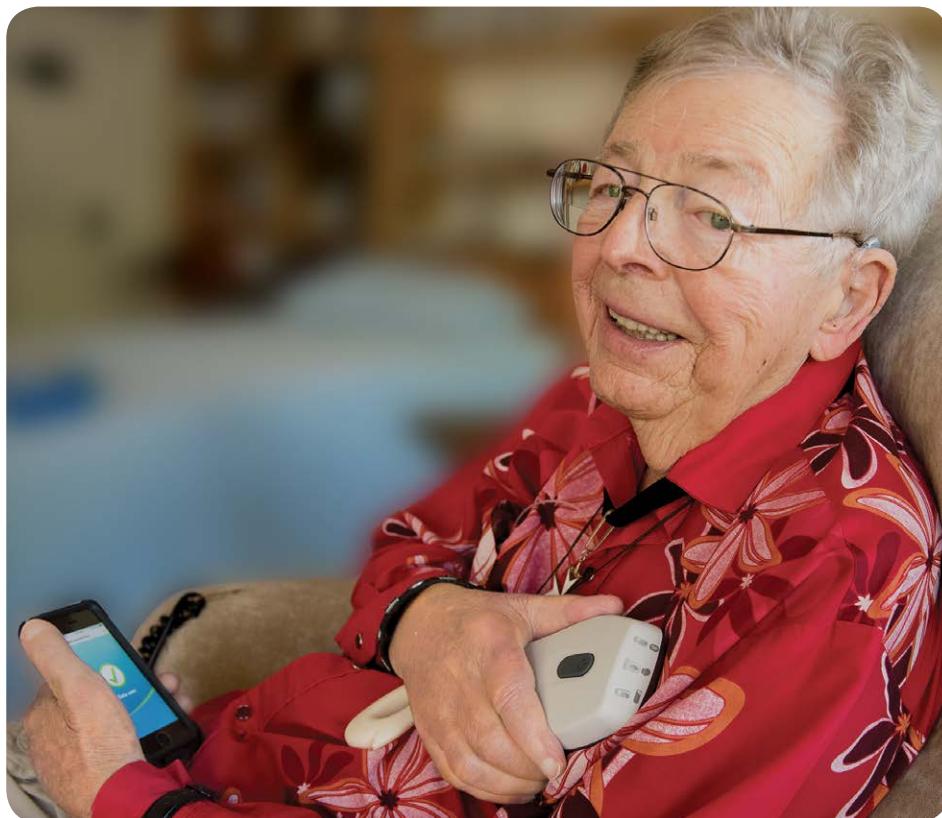
ates the need for clunky analog phone lines, but because the system uses Wi-Fi or cellular data to transmit, it's both familiar to most people and also allows their health care professional to remotely monitor their pacemakers from almost anywhere around the globe in the span of a few short minutes.

Then there's the peace of mind this technology offers family members.

With an app-based system such as this one, monitoring can be set up in such a way both family members and caregivers can be notified if a transmission is scheduled and if it has already taken place.

Finally, and perhaps the most practical application of this technology, is the convenience of remote monitoring. Given pacemaker patients are generally older, the arduous task of returning to the hospital for manual device check-ups can be a huge undertaking. Allowing health care professionals to remotely monitor patients' implanted pacemakers substantially increases their quality of life.

Strangely, one of the beneficiaries of this technology is a man who played an important role in the pacemaker's initial development. Earl Bakken, aged 92, is not only one of the founders of Medtronic, but also developed the first wearable, battery-operated pacemaker back in 1957. Now, from his home in Hawaii, Bakken uses his smartphone to send his pacemaker transmissions without leaving his chair, combining the technology he helped create with the smartphones we use everyday.



The man that helped develop the world's first portable pacemaker, Earl Bakken, sits in the comfort of his home where he enjoys wireless advancements afforded by the successors to his original design.

Allowing health care professionals to remotely monitor patients' implanted pacemakers substantially increases their quality of life.

# ONE DAY YOU COULD NEED AN MRI



**AFTER AGE 65,  
THE LIKELIHOOD  
OF NEEDING AN MRI  
DOUBLES.  
THIS AGE GROUP IS  
ALSO MORE LIKELY  
TO NEED A  
PACEMAKER.<sup>1</sup>  
PATIENTS WITH  
PACEMAKERS HAVE  
A 50-75%  
LIKELIHOOD OF  
NEEDING AN MRI  
OVER THE LIFETIME  
OF THEIR DEVICE.<sup>1</sup>**

Fifty years ago, when pacemakers were first implanted, there was no Magnetic Resonance Imaging. Yet, in 2012 alone, Canadians underwent 1.7 million MRI exams. MRIs have transformed the way patients are diagnosed and treated. They have proven highly effective in diagnosing cancer, Alzheimer's, stroke, heart or artery conditions, and muscle, bone and back pain, all of which are more prevalent among older Canadians.<sup>2</sup>

Historically, patients with implantable devices were ineligible to receive an MRI for fear the magnetic fields would harm the device or surrounding tissue.

At Medtronic, we recognize the value and importance of MRI tests. That's why in 2011 we launched the first MRI conditional pacemaker in Canada. We didn't stop there. We did the same for our neurostimulator in 2013, our insertable cardiac monitor in 2014, and our implantable cardioverter defibrillator (ICD) in 2015. Now, more Canadians with these medical devices can access an MRI. Consult your physician on the conditions of use.

Learn how we're taking healthcare Further, Together by visiting [Medtronic.ca](http://Medtronic.ca).

1. RON KALEN and MARSHALL S. STANTON, Current Clinical Issues for MRI Scanning or Pacemaker and Defibrillator Patients (PACE 2005; 28:326-328)

2. Medical Imaging in Canada: <http://www.cihi.ca/CIHI-ext-portal/internet/EN/TabbedContent/types+of+care/specialized+services/medical+imaging/cihi010642>



**Dianne Carmichael**  
Managing Director, MaRS Health Venture Services

## The Future of Health Belongs to Patients

**Based in Toronto at global innovation hub MaRS Discovery District, Dianne Carmichael is Managing Director of MaRS Health Venture Services, working to drive health system transformation by advising high impact start-ups and engaging corporate partners.**

### Mediaplanet How is digital technology putting health care decisions in the hands of patients?

**Dianne Carmichael** Health care has long been a closed system with silos of data locked away in filing cabinets or doctor's offices. Today, sensors, genomics, wearables, and Bluetooth-enabled devices are enabling health consumers to take charge of their care. The future will see patients engaging with a connected platform that effectively enables data sharing in meaningful ways across the spectrum of care — including remote health monitoring, electronic health records, coaching, and virtual visits. It will co-ordinate and engage the health ecosystem for the benefit of the patient. This shift is transformative from today's prevailing paternalistic attitude that father knows best.

### MP What's the role of start-ups in this?

**DC** Start-ups and the digital revolution are the driving force behind patient-centric health. Take *Ask The Doctor*, a secure interface that allows patients to ask health care related questions, or Cloud DX, a company making sci-fi a reality with a device that can identify up to seven respiratory diseases based solely on the sound of a patient's cough. Many ventures also work with health care providers to improve the patient experience. Shift Health's *TickiT* app allows patients to share their own information, bringing the patient voice to the clinic, and HQIC offers secure messaging and video consults between patients and providers.

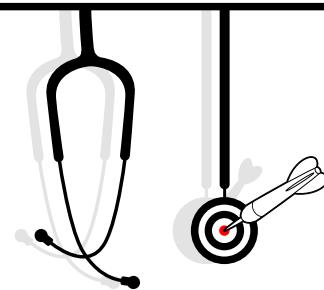
### MP What's next?

**DC** Wearables are just a taste of what's to come. Nanotechnologies, AI, robotics, and ingestibles are among the many innovations that will completely transform the health system — shifting the balance of power into the hands of patients themselves. ●

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# Precision Medicine Enables Health Care Providers to Deliver Personalized Treatment



**A**dvancements in technology are making it easier for Canadians to become more engaged in their health. Known as precision medicine, this emerging field allows health care providers to use personalized data to develop better treatment plans. The result is more effective care and a sense of patient empowerment.

You can already witness the effects of precision medicine within Canada's health care system today. "An oncologist knows that not all patients respond the same way to chemotherapy," Susan Anderson, Managing Director of Orion Health, says as she explains how genetic testing impacts cancer treatment. "They always have an array of different kinds of medication they can apply. Using the identification of a patient's genome patterns, oncologists can get a little more specific in terms of targeting more effective therapy programs."

Genomic testing represents just one facet of innovation within precision medicine. Research into the microscopic bugs living inside of us, known as the *microbiome*, is another. "With the ability to now analyze the components of the microbiome rapidly, doctors will have a much more accurate picture of the nature and type of bacteria in your body which can guide more accurate diagnosis and treatment strategies," explains Gary Folker, Executive Vice President of Orion Health.

Many Canadians are already becoming more engaged in their health and lifestyle habits using wearable technology. "Apps on smartphones and devices like Apple Watch and Fitbit collect data on our exercise

and sleep patterns and show us this information in an easy-to-digest form," says Folker. "This knowledge can be an extremely helpful way for an individual to track and analyze their progress and take responsibility for their health."

At the moment, health care providers don't have access to all the data they need about a patient, like their genetic makeup, biological characteristics and lifestyle, to create an effective care plan. Canada must invest in the technology infrastructure required to support such data storage and access while maintaining strict privacy standards. "The data can only be accessed by the individual, their health care team, and people in their trusted circle of care such as a family member," says Susan Anderson.

Once these databases are established, precision medicine can not only improve patient care but it also supports collaborative research across borders. U.S. President Barack Obama launched a \$215-million Precision Medicine Initiative last year to support research and innovation. "We pool together so that researchers, practitioners, [and] scientists can share," President Obama said during the White House Precision Medicine Initiative Summit in February 2016. "We may be able to accelerate the process of discovering cures in ways that we've never seen before." ●

Andrea Yu

Supporting Partner



# How Technology Is Helping Patients Be Heard

**A**ccurate information about patients is the lifeblood of health care at every stage from diagnosis through treatment. While tests and physical metrics are vital, Patient-Reported Data (PRD) provides the indispensable context that makes patient-centred care possible. Unfortunately, the traditional methods for collecting PRD are notoriously unreliable and inefficient. "We need to start utilizing innovation and design to bring the traditional clinical encounter out of the dark ages," says Sandy Penn Whitehouse, a pediatrician with 25 years of health care experience, and co-founder of Shift Health, a digital platform for PRD collection.

New evidence shows that using technological solutions for collecting PRD, like *TickiT*, a mobile interactive platform created by Shift Health, rather than interviews and paper questionnaires, results in substantially higher-quality data. These findings are in large part due to an increased sense of comfort for the patient. "Patients are concerned about what their physicians and front-line health staff think about them," explains Daniel Penn, CEO of Shift Health. "There is data showing that people

tend to be more truthful in technology assessments rather than face-to-face interviews."

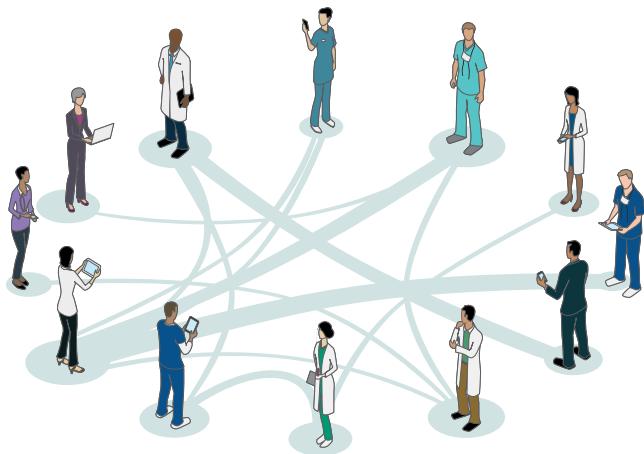
This discovery is especially true when it comes to sensitive topics like mental health issues, drug use, and sexuality. For example, early uses of Shift Health platforms showed a marked increase in detection of suicidal ideation in adolescents as compared to face-to-face interviews.

Transitioning patient data into the digital realm not only improves diagnosis and reduces physician workload, it also allows for more complex analytics, and can even help identify key areas for additional health care funding while saving on cost in the process. The wide-ranging benefits of this technology can be a boon to overworked health care professionals, helping them ensure that care is effective, efficient, compassionate, and always patient-centred. ●

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# INNOVATING HEALTH CARE

Experts discuss how technology is changing the health care referral system.



Visit [personalhealthnews.ca](http://personalhealthnews.ca) to learn more about how an e-referral could have saved Canadian Greg Price's life.



**Peter Smith**  
Executive Vice  
President,  
Strata Health

**Did you know that in Canada,** waiting for health care costs Canadians more than \$5-billion a year? For example, a patient waits six months to see a specialist only to find out they were waiting for the wrong type of specialist. Or, a patient ready for discharge blocks an expensive hospital bed while they wait for space to become available in the less expensive community health services they require. Imagine having \$5-billion to improve our health care.

We have been tackling this problem since 2001 by automating and streamlining transitions of care. We replaced the faxing of forms and referral letters with a system that matches patients to appropriate programs and services.

Our objective is to ensure the right patient gets to the right destination, at the right time with the right information. Each patient transition has distinct priorities, complex hand-offs, exceptions, patient choice options, waitlists, and legislation to consider.

Our service has been described as patient air traffic control, or Expedia for health, but neither of these analogies does justice to the complexity involved nor the consequences of getting it wrong. These are human lives, not airplanes and hotels.

In the near future, family doctors will refer patients to required services directly from their electronic system, and patients will leave with these appointments in hand. Patients struggling with mental health concerns will be able to self-refer into assessment and outreach programs. The future is brighter.

Visit [strata5B.com](http://strata5B.com) to share your thoughts on how to use 5-billion dollars to improve healthcare access.



**John Sinclair**  
CPHIMS-CA,  
President, Novari Health

**Canada's total annual spend on health care** per person is \$4,351 USD. The average among similar developed countries is \$3,453. In other words, we are already spending more than most other industrialized countries and yet Canada ranks poorly in access to care for many health care services, like specialist appointments and surgical care. Year-over-year growth in health care spending in Canada and elsewhere is widely viewed as unsustainable and does not seem to be improving patients' experiences.

If patient centred care is to be achieved in Canada, the delivery of health care, like other industries, needs to better leverage information technologies to deliver faster, more agile, less expensive, and safer health care. For example, to this day most referrals from one physician to another are sent by fax. The health care system does not manage referrals in order to send patients to physicians, hospitals, or clinics that may be able to provide faster service. Although billions of dollars have been spent in Canada to reduce surgical wait times, the results have been underwhelming.

Referral management and surgical wait times are both areas of access to care that can be dramatically improved with the use of modern information technology. Simple things like giving surgeons, their staff, hospitals, and regional health authorities web-based dashboards displaying in real time every patient waiting for surgery — and flagging long waiting patients — has proven to reduce wait times. Replacing faxed referrals with eReferrals with air traffic-like management of the system can balance referral loads across the health care system more efficiently and again reduce wait times. These Canadian made technologies are simultaneously good for patients, health care providers, the public purse, and would reinforce a patient-first approach to health care.



**Dr. Joshua Tepper**  
President, CEO,  
Health Quality Ontario

**Effective referrals are important** to help patients transition safely through the system. The impact of poor referral systems can include a delay in timely care, cost as tests and treatments may need to be repeated, and ultimately the patient's safety. Active patient involvement in the referral process helps with successful communication and more effective referrals. As a family doctor, my patients often ask me about the status of their referral — waiting is hard and uncertainty only makes it harder."



**Dr. Denis Vincent**  
MD, CCFP,  
CEO Medical Director  
[ezReferral.org](http://ezReferral.org)

**Not knowing, feeling left out;** it can be frustrating. Patients often feel this way when their family doctor refers them to the specialist. We all know faxing is unreliable. Faxes get lost. You might wonder: *Did my doctor send the letter yet? If they got the fax did they look at it? How come we haven't heard back? I hope it isn't serious, I'm afraid to call and disturb the office. Maybe I'll wait another couple of weeks. Maybe I'm on a waitlist. Maybe I missed the call. Did they forget me?*

Granted, most of the time things work out, but it can take many phone calls to follow up and double check just to be sure. Even so, waiting and not knowing causes too much unnecessary anxiety. However sometimes, things just fall through the cracks, and patients who fall through the cracks may be harmed or even die because of that delay. Today with modern forms of communication there is no reason for the patient to be left out of the loop.

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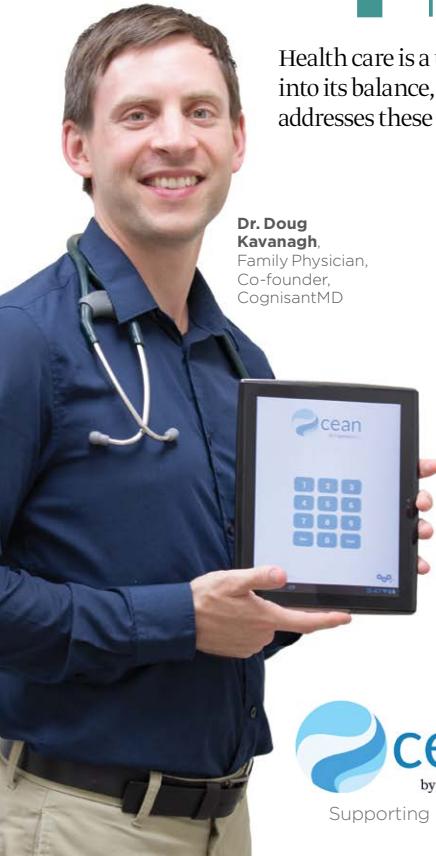
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# 4 Most Important Features for Patient-Facing Technology

Health care is a tremendously complex and human system. Sensitivity is required when introducing new technology into its balance, like tablets within the offices of doctors. A well-designed technology and corresponding platform that addresses these four elements can be instrumental in improving efficiency and efficacy in our health care system.

**Dr. Doug Kavanagh**  
Family Physician,  
Co-founder,  
CognisantMD



## Patient Comfort and Accessibility

Presenting patients with tablets in the waiting room allows them to easily provide vital medical information via an engaging interface. And, that engagement is extremely valuable for increasing the quality of the data in electronic medical records (EMRs). “Patients find a touchscreen interface very quick and easy,” says Doug Kavanagh, a Toronto-based family physician and co-founder of CognisantMD, the company behind Ocean medical tablets. “And, when they walk into the room and see that I have already seen everything they entered, literally seconds ago, they think that’s so cool.”



## Flexibility and Customizability

The needs of any one health care professional when it comes to patient-facing technology will differ from the needs of their colleague. And, the needs of tomorrow will differ from the needs of today. By allowing clinicians to edit and create their own solutions within the tablet, and by extending EMRs in an open manner, a good technology can lay the groundwork for future innovation. “We can’t afford not to open this technology up and let independent developers enhance the platform,” says Dr. Kavanagh.



## EMR Integration

There is no universal standard EMR in Canada. The database and record management tools can vary dramatically from one clinic to another. Technological solutions must be able to integrate with and sit on top of a variety of existing data infrastructures in order to flourish. “Physicians and healthcare workers simply do not want to interact with yet another system,” says Dr. Kavanagh. “Asking them to deal with logins and passwords and then copy and paste basic patient information from one system to another takes away time that could be better spent with the patient. It can also introduce errors in record keeping that could result in patient safety issues.”



## Information Security

EMRs contain some of the most private and sensitive information there is. New technology that interacts with EMRs must be very sensitive to patient data privacy standards like PHIPA. With proper implementation of client-side encryption and safe, Canadian-based data storage, new technologies can make our sensitive data ever more secure.

## Why do we give back to healthcare? Because it's our model. It's in our name.



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