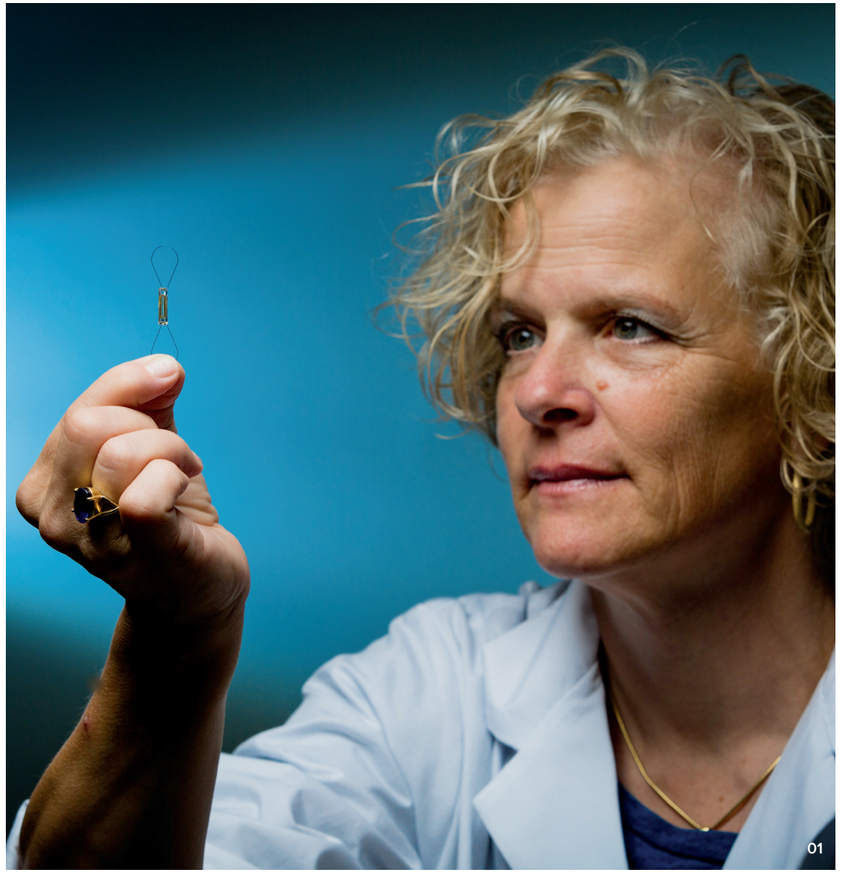
# Virtual care leaps forward

## Advanced technology helps doctors empower patients' self-care

By **Daina Lawrence**



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**MORE THAN ONE MILLION CANADIANS CURRENTLY LIVE WITH HEART FAILURE,** and 50,000 new cases are diagnosed each year. These numbers cost the Canadian health-care system more than $3-billion annually, according to the Heart Research Institute (Canada).

"We have an epidemic of heart disease, more specifically heart failure. And we can't keep doing big-box medicine," says Dr. Heather Ross, Director of the Ted Rogers and Family Centre of Excellence in Heart Function and a cardiologist at the Peter Munk Cardiac Centre (PMCC).

While medical advances in Canada are helping to treat those with heart disease, there are new systems that put the onus, as well as the power to drive an individual's health, back in the hands of the patient.

Innovations in heart failure research are spearheaded at the University Health Network (UHN) site of the Ted Rogers Centre for Heart Research, which is an integral program of the PMCC. Here, Dr. Ross and her team are using smartphone apps, digital platforms and even a Bluetooth-enabled monitor implanted into a patient's lungs to help manage symptoms and triggers of heart failure, educate patients and limit hospital trips.

Cardiovascular disease is one of this country's largest killers. Someone in Canada dies every seven minutes from a heart attack or stroke, according to the Heart and Stroke Foundation of Canada.

But this advanced technology helps health-care providers offer timely, optimal and efficient patient care with real-time patient data in the hopes of reducing the strain on Canada's health-care system.

"Virtual care has been a term that has been thrown around, but I think this is virtual care on steroids," says Dr. Ross. "What we have is a set of virtual tools to enhance self-care and to enlist patients in their own care, because patients are the largest work force in health care."

The main objective is to create an easy-to-use, patient self-care and treatment program that is both mobile and electronically based. Patients don't need to go to the clinic as often, and they can track symptoms and progress at the touch of a button, showing them how lifestyle choices can have an effect on heart health.

"If you think about obesity, diabetes, physical inactivity – all things that are risk factors for heart failure – if we can engage patients, we should be able to dramatically reduce the incidence or prevalence of heart disease, and therefore, heart failure," explains Dr. Ross.

And while some of the inner workings of these systems are staggeringly complex, the equipment the patients use at home is fairly simple.

Patients don't need to come into a clinic for a weigh-in. They can simply stand on a scale hooked up to an app on their smartphone, and the details are sent digitally to a team of health-care providers. At least this is the thinking behind Medly, a mobile application system designed at UHN that consists of a blood pressure cuff and scale that are digitally linked to a Bluetooth-enabled device.

Meredith Linghorne is a Nurse Practitioner-Adult at the PMCC, and she is on the receiving end of Medly's patient data.

"Medly allows us to see key clinical data, such as changes in weight and patient's symptoms, without having them come into the clinic," says Ms. Linghorne. She says that patients are asked to monitor their blood pressure, heart rate, weight and simple symptoms on a daily basis – something that would have been impossible before without daily trips to a clinic or a hospital.

"With this information, I know when they're getting into trouble. And this particular app is designed so they will get immediate feedback from us after taking their measurements, or the app tells them to contact us to discuss the problem."

For the clinicians, this advanced technology marries the vital components of self-management and education in cardiac health care.

Dr. Jane MacIver, nursing professor in cardiovascular research for the Ted Rogers Centre for Heart Research, says it's about the teachable moments this type of technology provides. A large part of cardiac health is providing patients with information about how lifestyle choices affect one's heart health.

Her work is focused around CardioMEMS, a system designed in the U.S. and only used on two patients in Canada so far, as approval is pending. CardioMems is a heart monitor that is inserted into a person's lung artery and gives real-time blood pressure readings back to the clinician, allowing for more immediate lifestyle or medication adjustments.

For instance, if a person has been neglecting a healthy diet and reaching for sodium-rich snacks, CardioMEMS will pick up on the effects. "For the patient, it allows them to see how the changes they make in their life can affect their reading," says Dr. MacIver.

"It's more impactful than saying, 'Don't take any more than 1,500 milligrams of salt. It doesn't mean anything to them, but they can see [a salty] buffet is bad because it causes weight gain."

As part of Dr. MacIver's research, her team will measure the out-of-pocket expenses associated with the CardioMEMS device. It's true there is no direct cost to the patient for the device itself, but Dr. MacIver explains there can be extra costs such as increasing the bandwidth on an individual's Internet to accommodate the device and its Bluetooth readings. There will also be home visits to CardioMEMS patients to study ease of use.

"I think it's one thing if the technology makes sense to a clinician, but if we find out it is really ineffective for the patient, then are they really going to use it," says Dr. MacIver. "It's taking it one step further and saying, 'Yes, we have this technology, but let's look at how it's actually picked up in the real world.'"

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**01** Dr. Heather Ross notes that the epidemic of heart disease in Canada means new monitoring methods, such as CardioMEMS, must be developed.

**02** Nurse Practioner Meredith Linghorne shows a patient how to use CardioMEMS, a mobile application system that allows real-time measurement of a patient's fluid status. The PMCC was the first health-care centre in Canada to implant a CardioMEMS device.

**03** Medly, the mobile application system designed at UHN, consists of a blood pressure cuff and scale that are digitally linked to a Bluetooth-enabled device.