



The right test, at the right time

As the appetite grows for medical testing, a palatable app is feeding physicians timely information

By Shannon Moneo

Cardiologist Dr. Sacha Bhatia and his team led the Echo Wisely trial, which examined ways to reduce the number of unnecessary echocardiograms being performed. The initiative was funded by the PMCC Innovation Committee.

INNOVATION CAN BE LIFE-SAVING, but if new and more productive ideas never make it beyond the lab or test stage, it becomes innovation inaction. Within the fast-evolving world of medicine, as new technologies, drugs and procedures are unveiled each day, having solid proof that a new innovation works as promised usually leads to greater adoption. The Peter Munk Cardiac Centre (PMCC) is putting such innovations into action, recently finishing a nine-hospital study where an online application was used to guide physicians in the appropriate use of echocardiography.

When Dr. Barry Rubin was asked in 2013 by the Government of Ontario to examine the appropriate use of imaging tests, such as echocardiography and magnetic resonance imaging, he wanted no outside interference and the freedom to produce an honest report. The stakes were rather high because Canada spends more than \$2.2-billion annually on such diagnostic imaging. Just a 10 per cent decrease in unnecessary testing would save \$220-million each year. What Dr. Rubin, the PMCC's Medical Director, and his Expert Panel on Appropriate Utilization of Diagnostic and Imaging Studies found is that 10 per cent to 30 per cent of imaging tests are done for inappropriate reasons.

"When you focus on electrocardiography, it's a \$140-million enterprise in Ontario, annually. If one-quarter of those tests were not carried out, it would produce savings of \$35-million each year," says Dr. Rubin, a vascular surgeon and also a Professor of Surgery at the University of Toronto. "The goal is to control costs by ensuring tests are done only for the right reasons, in a safe environment, by individuals who are trained to carry out and interpret the tests."

So the problem then becomes: "What are the right reasons?" Enter Dr. Sacha Bhatia, a cardiologist at Women's College Hospital and at University Health Network. "One thing we know is that some people get care they probably don't need," he says. The danger then becomes that patients will get false positive results or benign conditions will be flagged, leading to more, often



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unnecessary, care in a setting where health-care resources are stretched. "The basic premise becomes: 'How do we make sure the patient gets the tests they need?'" Dr. Bhatia asks.

Echocardiography uses ultrasound to create images of the heart in order to examine its blood supply, determine how large the heart is, how well it contracts and how the valves function. The test, using an ultrasound probe and electrodes attached to the skin, is done when people are concerned about, for example, heart disease, dizziness, irregular heartbeat or shortness of breath. It costs approximately \$100 for the physician to read the test results, plus another \$100 for the actual test, Dr. Bhatia notes.

While a research fellow in cardiology at Massachusetts General Hospital and a research fellow at Harvard University from 2011-13, Dr. Bhatia learned of an "appropriate use criteria" guideline that he combined with a pocket card that described the criteria in the context of common clinical scenarios and twice-monthly e-mail feedback on the appropriateness of test orders. When used by a study group, there was a 26 per cent reduction in echocardiography orders. In 2013, Dr. Bhatia was awarded the Arthur E. Weyman Young Investigator's Award by the American Society of Echocardiography and the Young Investigator Award from the American College of Cardiology for his work.

"We used very simple educational material, looked at their order patterns and examined the appropriateness," he says. Physicians were provided with clear guidelines and recommendations, based on key indicators. But more importantly,

the e-mail feedback informed the physicians how their peers were doing and which physicians were ordering fewer tests. "Doctors often don't get feedback on how they're doing," Dr. Bhatia notes. That information became significant because the doctors became more aware of how their patients were later doing and how much treatment cost.

In 2013, a University of Toronto study found that between 2001 and 2009, the rate of echocardiography increased by 5.5 per cent over the eight years, a rate that was adjusted for the rising number of older citizens and accelerating rates of disease. Dr. Bhatia attributes the rather high growth rate to patients' requests for tests and how physicians practise, meaning they don't refrain from ordering tests.

After returning to Canada, Dr. Bhatia began a similar 18-month study in 2014 at nine hospitals in Toronto, Kingston and Boston, involving almost 180 clinicians who were broken into two groups.

One group had no contact with Dr. Bhatia and his team. The second group got a YouTube video outlining the appropriate use of echocardiography and was given access to an online appropriate use criteria application for their phone. Research co-ordinators would record how often and why they ordered echocardiograms, and the data would be delivered to Dr. Bhatia. His team would input the information, and each month the physicians would receive an e-mail telling them whether the ordered test was appropriate or why it wasn't necessary. As the trial proceeded, there was a 25 per cent drop in the number of unnecessary echocardiograms. "There were no incentives. We

just gave them data in a very thoughtful way," Dr. Bhatia says. "By giving doctors information, we significantly changed their behaviour. It's about showing doctors how they practise in a way that's easy to digest, changing their practice for the better and improving their performance."

Or as Dr. Rubin says, "It's one thing to put together a recipe and another thing to follow it." He adds that Dr. Bhatia is putting into practice the recommendations from his 2013 report. "He's a superstar," Dr. Rubin says. "His work and the recommendations my expert panel made align. The problem had been that there were guidelines out there, but no mechanism to put them into action. He used technology to deliver a solution in a very effective way." The upshot is that doctors will order fewer tests, saving money, increasing access and reducing wait times for patients who require a heart ultrasound.

Dr. Bhatia, who also earned an Innovation in Quality Award last year, would like to apply the process to other tests. "It doesn't have to be limited to echocardiograms. It could be used for stress tests, CTs, MRIs, even for the prescription of drugs."

And as in the earlier U.S. study, Canadian physicians appreciate the rare feedback. "I think there's a real appetite to give doctors their performance data and how they can improve," Dr. Bhatia says. "No one wants to be mediocre." ▽

(The results of the Echo Wisely study were published in the Journal of the American College of Cardiology on August 21, 2017, a high-impact medical journal.)