# Peter Munk Cardiac Centre

CLINICAL AND RESEARCH REPORT

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CARDIOVASCULAR REHABILITATION

## A prescription for exercise

### GOODLIFE FITNESS TEAMS UP WITH THE PMCC FOR HEART HEALTH

"Congratulations. You've had a heart attack."

It's not exactly what you'd expect to hear from your doctor, but it's something that Dr. Paul Oh says to his patients all the time. As the newly appointed GoodLife Fitness Chair in Cardiovascular Rehabilitation and Prevention at University Health Network's Peter Munk Cardiac Centre (PMCC), Dr. Oh's mission is to help people with heart disease improve their health by making lifestyle and behavioural changes.

"Fitness has become the cornerstone of my medical practice," says Dr. Oh, who leads the GoodLife Fitness Centre of Excellence in Cardiovascular Rehabilitation Medicine, one of seven Centres of Excellence at the PMCC. "Having a heart attack is an opportunity to actually take control of one's life so that you can become stronger than you've ever been before."

With rates of cardiovascular disease on the rise in Canada, there is an urgent need to relieve the existing financial burden placed on our healthcare system through effective treatment and prevention programs. Evidence is mounting that exercise can have a key therapeutic effect.

*continued on page 2…*


Dr. Paul Oh, the newly appointed GoodLife Fitness Chair in Cardiovascular Rehabilitation and Prevention, at the 2015 running of the GoodLife Fitness Marathon in Toronto, Ontario.

## ABOUT THE PETER MUNK CARDIAC CENTRE

The Peter Munk Cardiac Centre is the premier cardiac centre in Canada. Since it opened in 1997, the Centre has saved and improved the lives of cardiac and vascular patients from around the world. Each year, approximately 55,000 patients receive innovative and compassionate care from multidisciplinary teams in the Centre. The Centre trains more cardiologists, cardiovascular surgeons and vascular surgeons than any other hospital in Canada. It is based at the Toronto General Hospital and the Toronto Western Hospital, members of University Health Network, which also includes the Princess Margaret Cancer Centre and Toronto Rehabilitation Institute. All four sites are research hospitals affiliated with the University of Toronto. For more information please visit www.petermunkcardiaccentre.ca

*…A prescription for exercise continued.*

"Our own research shows that people living with heart disease who exercise regularly will have a 50 per cent lower chance of dying than those who don't," says Dr. Oh. "On a global basis, large epidemiologic analyses about 'population-attributable risk' tell us that the biggest impact on improving health can be achieved by getting people moving."

## The first collaboration of its kind

The GoodLife Fitness Centre of Excellence in Cardiovascular Rehabilitation Medicine is a first of its kind, private/public collaboration bringing together two leading health and wellness organizations to further enhance the continuum of care for patients with cardiac disease.

At its core is a six-month program designed for people with a history of heart attack, patients who have undergone heart surgery, valve surgery, angioplasty, arrhythmia, angina or other heart conditions, as well as those at high risk of heart disease because of their family history, high cholesterol, high blood pressure or diabetes.

"What is unique about the GoodLife Fitness Centre of Excellence is that we can work with people over an extended period of time," says Dr. Oh. "With our six-month program, folks come in to see us once a week and spend 90 minutes with an interdisciplinary team of rehab specialists including nurses, kinesiologists, dietitians, psychologists, social workers and exercise physiologists. In that time, we not only engage in proper exercise training , but we also have the opportunity to provide the education, tools and support that will help patients be successful over the long-term."

## World-class research

A dedicated team has been hard at work over the last two years building a solid foundation to advance cardiac care and preventive programs. A comprehensive research program includes best practices in cardiac rehabilitation, analyzing cardiovascular databases to better understand long-term patient outcomes, as well as developing an innovative approach to the continuum of care for patients with cardiac disease.

Dr. Sherry Grace is leading research on the quality of cardiac rehabilitation programs across Canada.

"Our team is involved in ongoing research to determine optimal cardiovascular rehabilitation methodologies," says Dr. Sherry Grace, Director of Research at the GoodLife Fitness Cardiovascular Rehabilitation Unit located at Toronto Western Hospital. "We have been able to assemble a core group of very active scientists and researchers devoted to exercise and behavioural change for persons with cardiovascular disease."

In particular, Dr. Grace was the lead author in a landmark study published in the *Canadian Journal of Cardiology* in November 2014. *The Quality of Cardiac Rehabilitation in Canada: A Report of the Canadian Cardiac Rehab Registry*, measured 14 key quality indicators in 10 cardiac rehabilitation programs across Canada, assessing over 5,500 cardiac patients.

The criteria examined included: accessibility, wait times, referrals, secondary prevention, behaviour changes and psychosocial measures. The study found that cardiac rehabilitation programs are successful in: assessing patients' body composition (85 per cent), measuring blood pressure (90 per cent), increasing exercise capacity (68 per cent) and offering cessation therapy to patients who smoke (61 per cent). Areas requiring improvement included: measuring blood sugar in patients with diabetes (23 per cent) and assessment of depression (13 per cent).

"Being able to rigorously evaluate and compare across cardiac rehabilitation programs nationally means gaps can be addressed and changes made to ultimately benefit patients who have heart disease," notes Dr. Grace. "At present, only 30 per cent of hospitalized patients make it into cardiac rehabilitation and therefore they cannot reap all the benefits of participation. We need to dramatically increase those numbers through greater awareness and better access. Otherwise, cardiovascular disease will continue to put significant strain on our health system."


David Hawkins, left, exercises under the guidance of personal trainer Jonathan Joaquim as part of a joint venture between GoodLife Fitness and the Peter Munk Cardiac Centre.

## Care closer to home

After completing their cardiac rehab, it is critical that patients continue to self-monitor and regulate their heart-health behaviours. Launched September 22, 2014 across eight GoodLife Fitness Clubs throughout Toronto, *CardioStrong* is an innovative club-based program developed by rehabilitation experts at the PMCC along with GoodLife Fitness experts that helps patients transition into the community and achieve life-long success with their cardiac rehabilitation and health.

Through the development of a *Cardiovascular Rehabilitation Specialization* training course, GoodLife instructors obtain the necessary skillsets required to provide patients with self-management strategies to help them transition from the cardiac rehab program and continue to work towards minimizing their risk for cardiovascular disease progression following their graduation from the *CardioStrong* program.

"We need to break down physical walls between hospitals, health clubs and other community locations where health can be truly enabled in a safe and effective manner," says Dr. Oh. "Through the enhancement and growth of this partnership with GoodLife, cardiac rehab patients now have an incredibly unique opportunity to continue to positively impact their health and wellness within a continuum of care outside of the formal cardiac rehab program."

With a limited number of resources available in our healthcare system, access to funding and rehab programs in traditional settings like hospitals is no guarantee. Through linkages with partners in the community like GoodLife, cardiac rehab programs can better provide services to patients closer to home.

"There will be an increasing shift into the community with a focus on keeping people thriving at home," says Dr. Oh. "Through our partnership with GoodLife, we will be able to leverage technologies like wearable monitors and systems embedded into the home to provide close connections with healthcare teams and foster improved self-monitoring and regulation."

## What the future holds

In the province of Ontario, about 55,000 people will be leaving hospital this year after having had a heart attack, heart surgery, or angioplasty. Only about 18,000 will be engaging in a structured rehabilitation program. For each and every patient seen at the GoodLife Fitness Centre of Excellence in Cardiovascular Rehabilitation Medicine, improving or maintaining fitness is the key clinical goal.

"At a larger level within the healthcare system, there are millions of people walking around right now with multiple risk factors for heart disease," says Dr. Oh. "Ideally, we'd like to provide services for these individuals before they have a heart problem."

Leveraging community resources and outstanding facilities like GoodLife Fitness along with highly educated and trained individuals is the ideal way to engage these individuals.

"We want to see Canada get a whole lot healthier," says Dr. Oh. "We've seen so many inspiring stories in cardiac rehab, of people who have never exercised before. What is gratifying to see is that people can make a full recovery through rehab and indeed achieve health that is even greater than they had in the years leading up to their heart condition."

TED ROGERS CENTRE FOR HEART RESEARCH

# Technology, health and the home

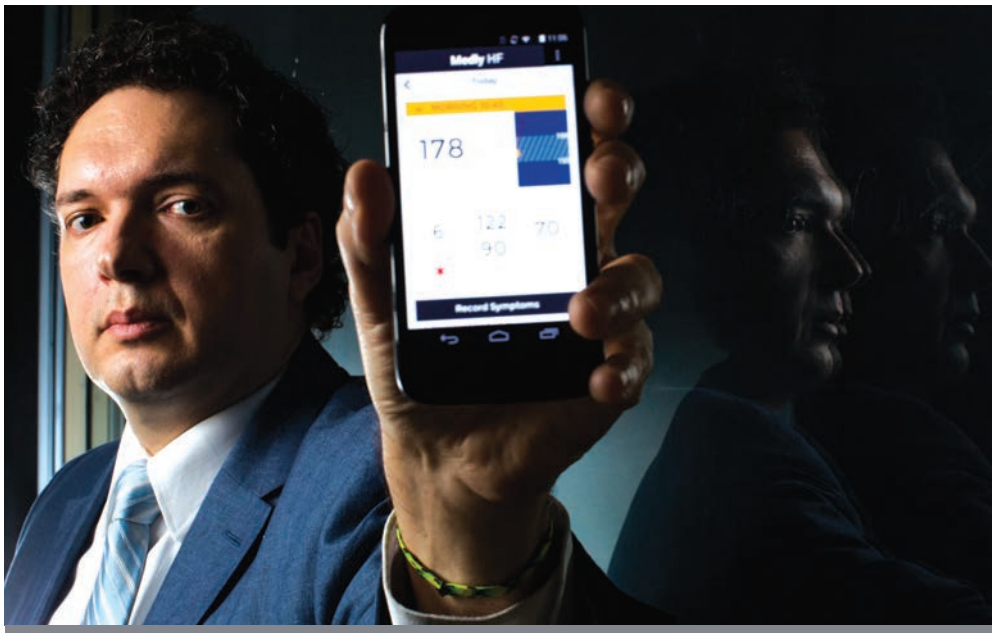
## DR. JOSEPH CAFAZZO IS AT THE LEADING-EDGE OF AN EMERGING TECHNOLOGY THAT PROMOTES PATIENT SELF-CARE

The digital age is ushering in a revolution that is transforming opportunities in healthcare and research. Working in the hospital setting as a biomedical engineer for the past twenty years, Dr. Joseph Cafazzo has witnessed first-hand the transformative potential of technology to improve healthcare delivery and empower patient self-care.

"Given the opportunity, patients have an immense capacity to care for themselves," says Dr. Cafazzo, Lead of the Centre for Global eHealth Innovation at University Health Network. "The healthcare system is growing, but our capacity to care for the aging demographic is becoming very difficult. Patients want to stay at home; they obviously don't want to be hospitalized. A patient empowered to self-care will have better outcomes than anything the healthcare system can do."

As part of the newly created Ted Rogers Centre for Heart Research, Dr. Cafazzo will be collaborating with physicians in the Heart Failure and Transplant Program at the Peter Munk Cardiac Centre to develop an innovative heart function home monitoring platform through leveraging state-of-the-art real-time telecommunication technologies.

"One of the special things we have here is unprecedented access to doctors, nurses and patients – the fact that we are embedded into a hospital is so important," explains Dr. Cafazzo. "Nowhere else is there a greater opportunity to evaluate the effectiveness of new healthcare technologies deployed in the hospital and in home environments."




Dr. Joseph Cafazzo is working with the Heart Failure and Transplant Program to develop a heart function home monitoring platform with a goal to reduce re-admission rates and reduce length-of-stay in hospital for heart failure.

With a goal to reduce re-admission rates and length-of-stay in hospital for heart failure by 50 and 20 per cent respectively over the next ten years, innovations in smart technology at the Ted Rogers Centre for Heart Research will usher in a new era of care to help prevent, manage, and survive the devastating consequence of heart failure.

### Human factors design

"We have a responsibility in the healthcare environment to design products that are easy to use, effective, and beneficial," says Dr. Cafazzo. "Patients can do a lot more if there is a system in place that allows them to contribute to their own care."

Many of the challenges with today's medical devices are not related to their functionality or technical reliability; rather, they can be explained by the principle of human factors design. That is, unless the design of the product fully understands the cognitive and behavioural aspects of how people deal with technology, this technology will ultimately prove to be ineffective.

"Currently, the majority of complex chronic disease patients, like those with heart failure, are aged 60 and above, and may find adopting new technologies challenging," explains Dr. Cafazzo. "Human factors engineering, deals with the aspect of applying physical and psychological

characteristics to the design of devices and systems for human use. In our laboratory, products undergo rigorous usability testing with patients and clinicians, incorporating their feedback to create the best user experience."

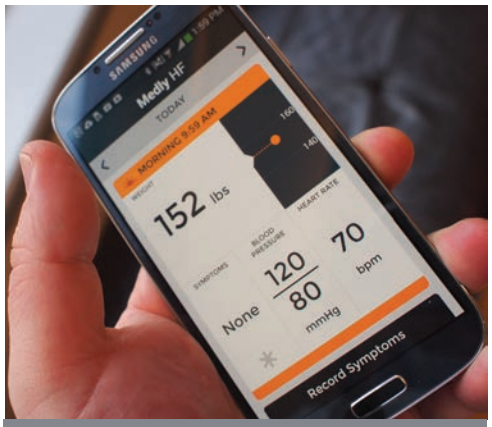
## Home monitoring for heart health

Heart disease impacts the lives of millions of Canadians and represents a major economic burden on hospitals. Home monitoring is one very cost-effective method to treat and care for many of these patients in order to reduce current high rates of hospital re-admission.

"Some of the sickest patients we have at University Health Network are the heart failure patients," notes Dr. Cafazzo. "We saw an opportunity to work with Dr. Heather Ross and her team in the Heart Failure and Transplant Program to increase patient self-awareness and self-efficacy."

The result was Medly, a smartphone application for both the user and health-care provider. A questionnaire-styled toolkit walks the patient through symptoms they are experiencing, and tracks the recording of symptoms over time to decipher patterns and trends.

The Centre for Global eHealth Innovation has completed a pilot study of 100 patients using Bluetooth enabled technology to transmit information regarding patient-weights, blood pressure and ECG recordings. This fall, Medly will be formally incorporated into the Heart Failure and Transplant Program through a select patient cohort.



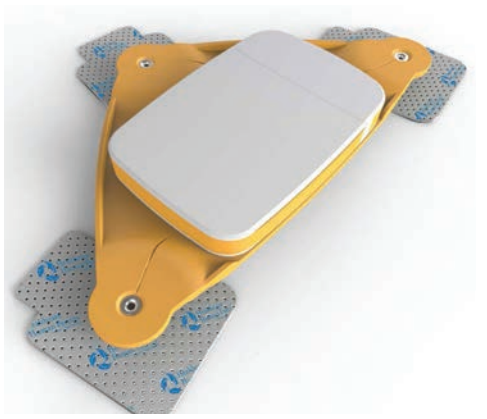

Medly encourages healthy behaviour by promoting patient self-management and self-monitoring.

## The rise of wearable technology

Medly is only the tip of the iceberg; an entry point to popularize the use of heart failure applications that cater directly towards the patient's needs; a starting point to create comfort and trust in all demographics.

"I think about what's next," says Dr. Cafazzo. "What motivates me is knowing that I need to get it right. What we do has to be effective in really changing the patient's life for the better. That's our measurement stick."

What's next is advanced wearables that continuously transmit data, experimenting with existing devices such as Fitbit® that track activity, exercise, food, weight and sleep.



The continuous ECG patch is capable of processing and communicating patient data in real-time.

"Studies have shown that wearable technologies like Fitbit® are predictive of cardiopulmonary activity," explains Dr. Cafazzo. "For example, if a patient is doing well, then their step-count is probably high. If we're seeing our heart failure patients only getting a couple of hundred steps a day, this presents a problem."

Other technology being developed to reduce heart failure re-admission includes a wearable ECG patch that sticks to the user's chest and can be worn under clothing. The ECG patch provides continuous real-time heart rate, respiration rate and heart rate variability and can wirelessly upload vital signs data in real-time for analysis or long-term record keeping.

"I believe we're really just scratching the surface," says Dr. Cafazzo. "Technology is going to transform the way we deliver healthcare and we're on the cusp of something transformational. It's easy to get up in the morning when you are doing such important work."

FOCUS ON RESEARCH

# Key appointment highlights world-class expertise

## DIVISION OF VASCULAR SURGERY WELCOMES DR. THOMAS FORBES

It was the unique collaborative approach of the Peter Munk Cardiac Centre (PMCC) that attracted Dr. Thomas Forbes to join the Division of Vascular Surgery.

Dr. Forbes arrived to the PMCC in September 2014 after serving as Division Chair and Chief of Vascular Surgery at University of Western Ontario. "I wanted the opportunity to pursue clinical, educational, and academic goals with the potential for global impact, in a competitive, multidisciplinary, multi-hospital organization," says Dr. Forbes.

"In my new position, my goal is to raise the profile of Vascular Surgery onto the world stage, via collaborative efforts in the academic, educational and clinical settings," he continues. "As a relative newcomer, but one with some experience, I can bring new ideas to the Division of Vascular Surgery."

Those ideas include the aforementioned collaboration, not only within the PMCC, but with other institutions. One such example involves one of Dr. Forbes' particular areas of interest and expertise – complex aortic surgery.

Paralysis after operations on the thoracic and abdominal aorta can be a potentially devastating outcome for patients, affecting up to 10 per cent of this patient population. "The surgery can be very challenging due to the many tiny blood vessels branching off the artery to the bowel, liver and, of course, the spinal cord," Dr. Forbes notes. "We have made tremendous advances in surgical techniques over the last 10-15 years, and we have improved spinal cord protection using drugs and advanced monitoring technology, but the risk is still approximately 10 per cent."

Dr. Thomas Forbes, the newly appointed Chair in the Division of Vascular Surgery at the University of Toronto, has a keen academic interest in pursuing spinal cord protection, what he terms the 'Achilles Heel' of complex aortic surgery.

He believes that one of the most exciting opportunities available in this area is the chance to collaborate with world-renowned neurosurgeon Dr. Michael Fehlings at the Krembil Neuroscience Centre, Toronto Western Hospital.

"There is an opportunity to share our research and experience," says Dr. Forbes. "We are already beginning to look at translating some of Dr. Fehlings' work, both with animal models and in humans, into clinical practice with our patients."

In addition to spinal cord protection in aortic surgery, Dr. Forbes is involved in other exciting research initiatives. One of the more intriguing involves patient attitudes to their treatment, examining what is termed 'patient-derived' or 'patient-reported' outcomes.

"As doctors, we are pretty good at explaining risks and benefits or pros and cons of certain medical treatments to patients – or, at least we think we are," Dr. Forbes explains.

"For example, we may say that 'with this procedure the risk of mortality is less, therefore it must be better.' However, if that procedure will result in more surgery down the line, or ongoing monitoring that will seriously impact his or her life, the patient may not agree."

"The question, of course, is 'how do you do this?' That's where research is important," Dr. Forbes states. "Perhaps we need to look at clinical trial design, adding patient advocates, for example. We have to incorporate what the patient wants into our thinking."

There are other projects Dr. Forbes is pursuing, including improving imaging outcomes by looking at the patient's physical position during the test, and investigating a Toronto-wide surgical collaboration on aortic surgery. With his energy and passion, it will be worth checking back in a few months to see how these – and other initiatives – have progressed.

PROVINCIAL LEADERSHIP

# Improving cardiac care in northwestern Ontario

## PMCC PARTNERS WITH THUNDER BAY REGIONAL HEALTH SCIENCES CENTRE

In partnership with the Peter Munk Cardiac Centre (PMCC), the Thunder Bay Regional Health Sciences Centre is expanding its advanced cardiovascular services program to deliver on-site vascular surgery and develop a plan to deliver cardiac surgery closer to home for patients in northwestern Ontario.

"The goal of this partnership is to give patients in Thunder Bay local access to heart and blood vessel surgery," says Dr. Barry Rubin, Program Medical Director of the PMCC. "No one should have to travel 1,000km and be separated from their family to undergo standard bypass surgery."

Northwestern Ontario has higher than average rates of cardiovascular disease with approximately 350 patients a year being referred out of this region for vascular surgery and vascular related procedures.

Dr. Barry Rubin (third from left) was joined by Dr. Peter Pisters, President and CEO of University Health Network (fourth from left) and Dr. Eric Hoskins, Ontario's Minister of Health and Long-Term Care (fourth from right) at the announcement of the partnership.

Providing the residents of this region with better access to cardiovascular services is part of the Ontario Ministry of Health and Long-Term Care's *Patients First: Action Plan for Health Care*, meant to provide patients with faster access to the right care.

"The one program on two sites model that we will implement will ensure that the quality of care delivered in Thunder Bay and at the Peter Munk Cardiac Centre is the same," says Dr. Rubin. "Quality, safety and local access to care will be the cornerstones of this partnership."

This initiative is reflective of the PMCC's vision to transform and enhance the delivery of cardiac and vascular care for patients across Canada.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### Acknowledgements

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Dr. Douglas Lee
Dr. Paul Oh
Dr. Peter Pisters
Dr. Heather Ross
Dr. Barry Rubin

# In the news

## Dr. John Floras elected to prestigious Fellowship

The Peter Munk Cardiac Centre's Dr. John Floras has been elected to the Fellowship of the Canadian Academy of Health Sciences. Considered one of the highest honours for Canadians in the health sciences community, election to the Fellowship occurs through a nomination and peer-review process that demonstrates Dr. Floras' internationally-renowned leadership and broad range of achievements.

The award recognizes Dr. Floras' contributions to our understanding of hypertension, heart failure, sleep apnea and the role of heart function on the kidneys and lungs. He has published approximately 250 articles that have been cited close to 10,000 times – evidence of the impact and significance of his work.

## Dr. Douglas Lee receives Canadian Cardiovascular Society Award

Dr. Douglas Lee, Peter Munk Cardiac Centre staff cardiologist and Toronto General Research Institute Scientist, has been awarded the Canadian Cardiovascular Society's 2014 Robert E. Beamish Award. This honour is bestowed upon the lead author of a research article published in the *Canadian Journal of Cardiology* within the past three years that is judged to have the greatest potential impact in cardiovascular medicine.

"There are many excellent cardiovascular research scientists, and it is fabulous to have colleagues and peers appreciate your work," says Dr. Lee. "I have a great group of colleagues at the Peter Munk Cardiac Centre who have shared their enthusiasm for heart failure outcomes research. I am immensely proud for their support and collegiality."

## Dr. Phyllis Billia honoured with Young Investigator Award

Dr. Phyllis Billia, cardiologist and clinical scientist at the Peter Munk Cardiac Centre, has received the prestigious Young Investigator Award from the Canadian Cardiovascular Society for her leading-edge research into the processes needed to allow heart cells to regenerate – a concept that could potentially be applied to other organs that do not naturally regenerate (including the brain, kidney and pancreas).

"I would categorize my work as being 'outside the box'," says Dr. Billia when asked why she thinks the award was given to her. "It is out of the ordinary and takes my exposure to working in a cancer laboratory doing my post-doctoral studies into account. It defies the dogma of traditional boundaries associated with individual specialties; even people in the tumour suppressor field are intrigued by the results of my work."

Drs. Floras, Lee and Billia have all received prestigious awards for their outstanding contribution to cardiovascular care and research.

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