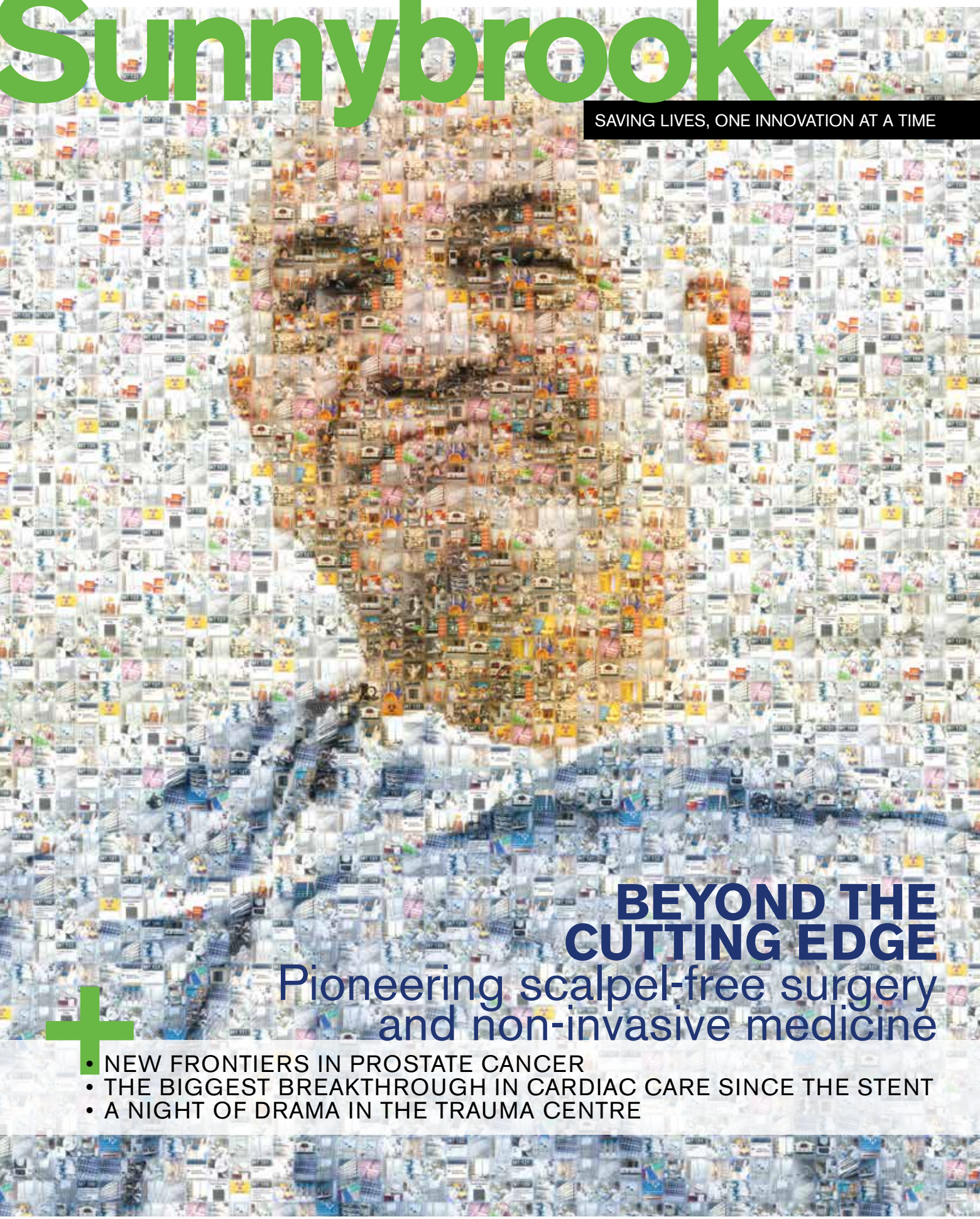
# Sunnybrook

SAVING LIVES, ONE INNOVATION AT A TIME



## BEYOND THE CUTTING EDGE

Pioneering scalpel-free surgery and non-invasive medicine

+

- NEW FRONTIERS IN PROSTATE CANCER
- THE BIGGEST BREAKTHROUGH IN CARDIAC CARE SINCE THE STENT
- A NIGHT OF DRAMA IN THE TRAUMA CENTRE






***ON THE COVER***


The image of focused ultrasound patient Tony Lightfoot was created from hundreds of photographs of Sunnybrook's CeRIGT research projects (see pages 18-19).

*Cover art by Malcolm Brown*

IN EVERY ISSUE

# Sunnybrook


**PUBLISHERS**
Craig DuHamel
Pamela Ross

**EDITOR-IN-CHIEF**
Simon Beck

**EDITOR**
Michael McKinnon

**ART DIRECTOR**
Frank Perito

**FEATURE WRITERS**
Alexis Dobranowski, Michael McKinnon, L.H. Tiffany Hsieh

**CONTRIBUTORS**
Steve Adams, Tamara Baluja, Dan Birch, Laura Bristow, Malcolm Brown, Natalie Chung-Sayers, Allison Dunfield, Augusta Dwyer, Sybil Edmonds, Jennifer Foster, Sally Fur, Hannah Hoag, Alisa Kim, Jane Langille, Monica Matys, Celia Milne, Katherine Nazimek, Nadia Radovini, Stephanie Roberts, Marie Sanderson

**PHOTOGRAPHY**
Tim Fraser, Doug Nicholson, Galit Rodin

## GLOBE EDGE

Teena Poirier
DIRECTOR, CLIENT ENGAGEMENT & GLOBE EDGE

Charlene Rooke
GROUP EDITOR, GLOBE EDGE

Liz Massicotte
PROGRAM MANAGER, GLOBE EDGE

Sally Pirri
DIRECTOR, PRODUCTION, THE GLOBE AND MAIL

Cara Czech
PRODUCTION CO-ORDINATOR, THE GLOBE AND MAIL

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**ALL CORRESPONDENCE**
Sunnybrook
2075 Bayview Avenue, Suite D100
Toronto, Ontario M4N 3M5

questions@sunnybrook.ca
www.sunnybrook.ca



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Sunnybrook *in partnership with* THE GLOBE AND MAIL


*Using focused ultrasound, Sunnybrook researchers are ridding patients of tremors that have plagued them for decades without ever cutting the skin.*

# Our vision for the future of health care

**BY CELIA MILNE**

Treat the untreatable. Stop the unstoppable. See the invisible.

At Sunnybrook, the future of health care is now. It is in imaging techniques that find diseases earlier, so they do less damage. It is in maintaining healthy bodies and minds. It is in treatments that are more precise, that hurt less, that are less expensive and that are safer than in the past. It is in teaching cutting-edge techniques to others in Ontario and the world.

These aren't "pie-in-the-sky" goals; many elements of this extraordinary future are already partially realized. "We have a vision that we are delivering right now," says Dr. Barry McLellan, president and CEO of Sunnybrook. "We're excited about it, and appropriately so. We know we can do it. There is evidence we are changing the outcome right now."

Right now, Sunnybrook is using high-intensity focused ultrasound (HIFU) technology to zap a tiny spot in the brain responsible for debilitating tremors that are resistant to medical treatment and make everyday tasks – like feeding oneself – impossible.

Right now, Sunnybrook is replacing heart valves without having to do open-heart surgery. This is saving the lives of people who are told they aren't able to withstand such an invasive procedure.

Right now, Sunnybrook is implanting radioactive seeds in breast cancer tumours, to save as much healthy tissue as possible and spare women the life upheaval of frequent, in some cases daily, radiation treatments.

Based on the proof of these successes, it is Dr. McLellan's goal to see Sunnybrook discover and then offer to patients non-invasive and minimally invasive diagnosis and treatments as a matter of course.

There are a number of innovations on the health-care horizon.

- Radiation aimed at tumours with pinpoint accuracy using advanced imaging technologies
- Using ultrasound to kill disease that can't be reached by a scalpel
- Managing stroke treatments in real-time as they work to heal the brain
- One-of-a-kind treatments based on the unique biology of an individual patient.

Because Sunnybrook treats the most critically ill patients in Ontario, the community counts on the hospital for leading-edge discovery. "It's about changing lives," says Dr. McLellan.

Private philanthropy is a very important source of Sunnybrook's lifeblood. It helps to ignite brand-new, visionary solutions. "Sunnybrook relies on private donations to accelerate the pace at which it finds innovative solutions to life-threatening health-care challenges," says Dr. McLellan.

About 75 per cent of Sunnybrook's operating expenses come from government, mostly the Ministry of Health and Long-Term Care (MHLTC). Approximately 10 per cent comes from granting agencies to support research, and 15 per cent comes from non-governmental resources. Donations made to Sunnybrook Foundation act as a catalyst to inspire new research – often in areas not yet funded or approved by government – that will later benefit many people.

For instance, a private donation to Sunnybrook Foundation in 2009 provided seed funding for a new procedure that has since saved the lives of 150 frail, elderly people. Called transcatheter aortic valve implantation (TAVI), the procedure widens a crucial valve in the heart, and can be performed on those who wouldn't survive the other option: open-heart surgery.

Early in 2013, Sunnybrook's Schulich Heart Centre's TAVI program received approval by the MHLTC to proceed with 75 procedures funded by government. Sunnybrook is also taking a leadership role in training personnel at other TAVI centres across Canada.

Essentially, government funds and money from granting agencies combine with donor money to make innovations possible. It is a grand partnership, with the altruism of donors being a critical step in moving these projects forward.

"What do you care deeply about?" asks Dr. Jon Dellandrea, president and CEO of Sunnybrook Foundation. "Your health. Your family's health. We all have a deep, visceral concern about health care and how we're going to be treated.

"Private philanthropy can make a huge difference in institutions with high aspirations such as Sunnybrook in order to realize objectives and make a profound difference. Acts of vision and ambition are made possible by generosity."

# WE ARE SUNNYBROOK

*faces of our staff and our community*






## KEEPING IT GREEN

*← Laura Hough is the Manager of Energy & Sustainability in Plant Operations and Maintenance. A mechanical engineer by training, Laura was one of only six women in her graduating class of 90 students at the University of Waterloo. While doing a co-op for an Alberta oil company, she saw the documentary* An Inconvenient Truth *and her passion for environmental sustainability was ignited.*

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"I remember thinking, 'How can anyone not be doing anything about this?' I brought the film in to show, and no one cared. I knew right then I was in the wrong field.

Once I had that epiphany, I started focusing on energy efficiency and sustainability. It just made sense. It's about reducing impact on the environment to be able to keep doing things indefinitely, so that our kids and future generations get the same benefits as us.

I was drawn to Sunnybrook for its reputation as one of Canada's Greenest Employers (for five years in a row).

Energy is a big need for us as a health-care organization – we depend on it. There's plenty of equipment and critical areas need good ventilation, so there's more motivation to be green. And it all connects back to good health. By reducing air pollution and greenhouse gases, there are fewer health problems. In addition, saving energy saves costs.

I'm fairly new to this role. I'll be working with various areas of the hospital – Plant Operations, Facilities Planning, Environmental Services, Parking & Transportation, and Purchasing , to name a few – to help identify and manage energy saving strategies, and opportunities to incorporate green.

I had a high school teacher who once said: 'If you're smart enough, you should be a doctor,' but I can't stand blood. It's interesting that I'm now in this industry, not as a health-care worker, but at the end of day, I am helping people. *– As told to Nadia Radovini*


## SHE'S GOT YOUR BACK

*Elizabeth (Liz) Donaldson-James is section leader of the Ambulatory and Diagnostic Care Unit's Colonoscopy/ Endoscopy Clinic, and herself a colon cancer survivor. She began part-time at Sunnybrook in 1985 while studying at York University. Her health administration career spans 28 years, including 10 years working in intensive care. This November marks her 12th year in colonoscopy/ endoscopy.*

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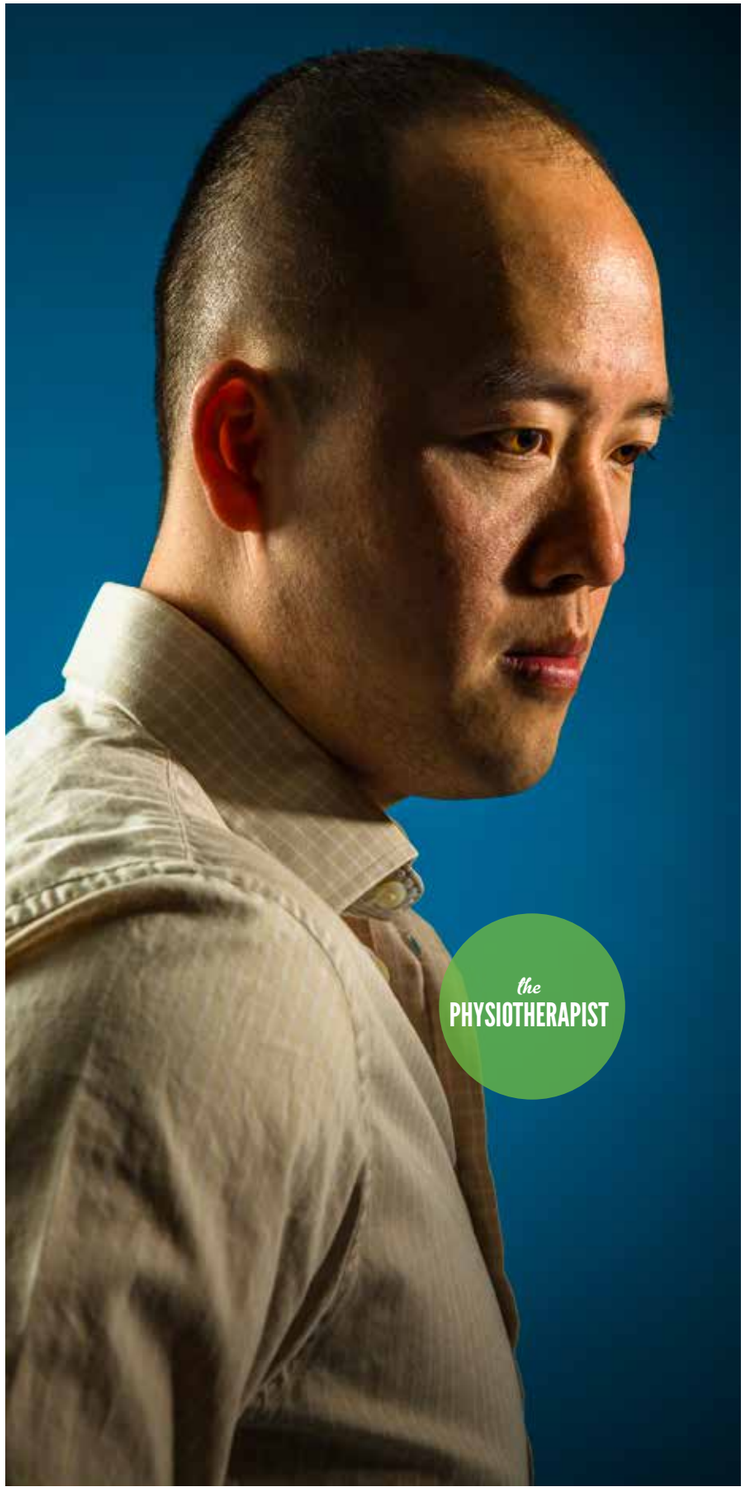
"I'm living proof you can work your way through health challenges, but only with the support of others.

The care I received here when I was diagnosed with colorectal cancer in 2010 and with my subsequent stroke – that journey made me prouder and even more connected to the place I call work. I experienced first-hand the tremendous dedication and expertise of our care teams and the reassurance that everything was going to be okay.

To predict the outcome ... now that would be powerful. I help patients do the next best thing.

Sometimes it's the little things that mean a lot – a caring word, a warm smile. And I'm straight up with them. I tell them, 'You're in the right place and you're in good hands.'

Having been there myself, I speak from the heart. I tell patients: it's good to know someone's always got your back. *– As told to Natalie Chung-Sayers*




# FULFILLING A LIFELONG DREAM

*Gary Siu, a physiotherapist at Sunnybrook's St. John's Rehab, has treated inpatients and outpatients in neurology, orthopedics and trauma. In 2008, he was the first physiotherapist to visit the district of Kpandai in Northern Ghana, where he provided treatment and education to villagers who live with the effects of disease and disability. His mission continued in 2011 and he plans to return again.*

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"Every day, I get to celebrate victories.

Building the strength to sit up, stand and then walk; gaining the energy to do household chores; enjoying leisure activities; going to work in the morning. These are tasks many of us take for granted. But to the patients I see every day, these are no small feats.

Our patients have gone through life-changing illnesses and injuries. Many are unable to participate in the activities that were once easy, necessary or meaningful. What I get to do at St. John's Rehab stretches beyond providing the clinical functions of physiotherapy. I treat people, not just their medical conditions.

As part of an interprofessional team, I educate, motivate and provide appropriate exercises and aids to our patients to help restore their health . We give hope and strength to accomplish the goals they want to accomplish, whether it's taking one step or running a marathon.

St. John's Rehab works with unique patient populations in Ontario and across Canada. The specialized skillset and knowledge of our team allow me to learn something new all the time simply by observing others in action. The experiences I've gained at the hospital combined with the support of my colleagues have enabled me to fulfill a lifelong dream of using this expertise to help others living in a developing country.

No matter where I am, I am inspired by the common resilience of the human spirit in achieving anything despite what life may throw at it. Each patient who comes through our doors will face different challenges and milestones they want to conquer. I consider it a privilege to be part of their journey: to walk with them, both figuratively and literally, in their recovery process. Along the way there is both laughter and tears, but to me it's all part of the relationship we are blessed to share.

*– As told to Katherine Nazimek*






# TO SIMPLY LISTEN AND ACT

*Dr. Jeff Myers is head of the Palliative Care Consult Team at Sunnybrook. He oversees a team of 15 staff and clinicians and is the academic head of University of Toronto's Division of Palliative Care. Before joining Sunnybrook in 2005, he was Associate Medical Director of the Hospice and Palliative Care Program at Cedars Sinai Medical Center in Los Angeles.*

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"Most people equate palliative care with dying. I'm often met with 'Wow, that must be so depressing and difficult; how can you take care of dying people all the time?'

We're taught in medicine to heal, to reverse injury, to fix things in people. This is in direct contrast to the reality that every person is going to die. To be involved in a person's life at such an intimate time and contribute to lessening their suffering is incredibly gratifying. It's a life-changing experience for family members when someone dies. When everything is done well, the relief and gratitude that family and loved ones express is massive.

Palliative care, though, is much more than care at the end of a person's life. It's not an alternative to 'active care' or something to be saved for the time when 'we've done everything we can.' It's about listening to people, figuring out their story, determining what's preventing them from experiencing joy no matter where they are in their illness journey.

There's a definite science to effectively managing a person's symptoms, be they physical, emotional, spiritual, existential. None of what I do is magic. I ask the questions that need to be asked, and simply listen to and act on the answers. To me, this is just providing good care.

Why do I work at Sunnybrook? There is an eagerness among the front-line staff to always do better for people who are suffering. The staff has genuine heart and maintains a real sense of humanness. Sunnybrook's leadership team has been nothing but supportive of the Quality Dying Initiative. As one of the only hospitals in the province with an organization-wide commitment to the quality of the dying experience, improving care for a dying person wouldn't be possible without support from a high level at the hospital.

My day-to-day work life? It's a privilege to be present with people who find themselves at such an unfamiliar and vulnerable time in their lives and rarely do I feel sad. It's only when I stop for a moment and think about the impact that is made – that's when it becomes emotional. *– As told to Marie Sanderson*


# ‘I KNOW I MAKE A DIFFERENCE’

*Lisa Verity is a nurse navigator at the Marion C. Soloway Breast Rapid Diagnostic Unit in Sunnybrook’s Odette Cancer Centre. Her career in nursing spans over three decades, with a focus on breast health and screening for the past 23 years.*

“In 1984, my sister-in-law Carol was diagnosed with breast cancer. I saw first-hand how she struggled not only with the disease, but with gaps in the health-care system. Carol passed away 10 years later, but she remains a huge inspiration in my life and my career to this day.

In my current role, I see hundreds of women every year who have had a suspicious finding in their breast, and don’t know if they are facing cancer or not. They come here to find answers during an incredibly stressful time and need a great deal of support.

I help guide them from the time I receive their referral. I help assure them about the direction they need to take once their tests are done. The Rapid Diagnostic Unit is a leading model for care because it provides next-day diagnosis and personalized screening recommendations. I hear similar comments from nearly every woman I see in the unit. They just need to know!

While my role as a nurse navigator can be emotionally challenging at times, I know that I make a big difference in the lives of many women. This is what keeps me going. Recently, one of my patients passed away, someone very dear to my heart. As a longstanding Sunnybrook donor, the plan was to put her name on one of the rooms in the new Louise Temerty Breast Cancer Centre. I was completely shocked when I got a call from Sunnybrook Foundation, telling me she wanted a room named after me instead. It was such a moving gesture that reinforced that the work I do as a nurse does matter.

It’s an unbelievable honour to make a difference in someone’s life. That’s the reason I do what I do.

*– As told to Monica Matys*

# GOING OUT ON A LIMB

*Terrence Yuen is an occupational therapist at Sunnybrook’s St. John’s Rehab with more than 25 years’ experience in his profession.*

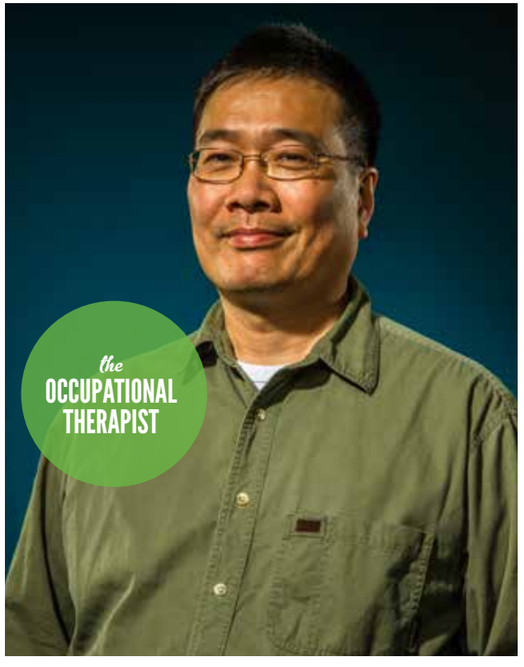
“I’ve worked with many clients, including survivors of burns, traumas, spinal cord injuries and amputations. When I first meet them, they are dealing with the emotional and physical challenges of living fulfilling lives. They want to be parents, workers and friends. All these goals represent different levels of physical and functional challenges. This is where my role begins.

Often the first thing I ask clients is, “what are the top five things you want to be able to do?” Their answers are often the simple daily activities many of us take for granted. I analyze the challenge and work with them to find the solutions.

One client, whose arm was amputated, wanted to be able to play pool with his friends again. I helped tailor his prosthesis with a special device so he could hold a cue stick properly. We played pool together as part of his rehabilitation, which was a profound experience for both of us.

Even though I am able-bodied, I always put on a prosthesis when training a new client. Using the same hook or device my client is using really helps me understand their world and the challenges they face. When they see me achieve the task with my prosthesis, they know it’s possible and there is a light at the end of the tunnel. It’s truly a great bridge between us.

I treat a thank-you card from clients as a humbling reminder that I’m on the right track. I owe so much to them as well. Seeing people rise above adversity has taught me to overcome my own stumbling blocks, and be grateful for what I have. *– As told to Monica Matys*






# RIGHT TIME, RIGHT PLACE, RIGHT PERSON

*Danielle King is a registered nurse and Clinical Care Leader in Sunnybrook’s emergency department where she has worked for five years. Recently, Danielle was awarded a citizen award from Durham Regional Police for saving the life of a man who had a heart attack behind the wheel of his car at an intersection in Ajax, Ont.*

“I was driving home from a baby shower, and I knew something was wrong when that light turned green and the driver in front of me didn’t move or respond to my honking. I jumped out of my car, followed by a few others. The driver was unconscious, but still had a pulse.

We got him out of the car and onto the ground. He lost his pulse so I started CPR. His pulse came back, but was lost again. I continued CPR with the help of a bystander I recruited until emergency responders arrived and shocked him with a defibrillator, regaining his pulse once more.

I don’t feel I did anything another person wouldn’t have done, but being able to rely on my experience as a nurse in the Sunnybrook emergency department definitely gives me the confidence to know I can handle any situation I encounter.

A few weeks later I got to meet the man, his wife, and their three children. We couldn’t get over how fortunate it was I happened to be in the car behind him. It was definitely a ‘right time, right place’ moment.

I really can’t see myself working anywhere else but the emergency department at Sunnybrook. I love the high energy, and the adrenaline that comes with never really knowing what my day is going to entail. The people I work with are amazing. We communicate really well as a team, and support each other. Every day I learn something new from them.

The greatest satisfaction though, comes from helping our patients. Providing comfort, catching complications before they become worse, and saving lives – these are the best rewards I can imagine. When I came to the aid of the man in Ajax, it was second nature. It’s what I do every day. *– As told to Laura Bristow*


# LAUGHTER, THE BEST MEDICINE

*After completing medical school at the University of Toronto, Dr. Vikas Bansal joined the Holland Orthopaedic & Arthritic Centre at Sunnybrook in 2008 as a hospitalist – a physician focusing on caring for hospitalized patients. He enjoys helping them through research, developing new policies and guidelines – and by bringing humour onto the ward.*

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"I've always been passionate about comedy and medicine. During medical school, I was able to combine these passions by getting involved with Daffydil, an annual musical production put on by students in the Faculty of Medicine.

With residency, however, came long hours, and it was harder to find a work-life balance. After some time without comedy in my life, I felt as though I was starting to lose my human connection. I wanted to find a career in medicine that would allow me enough flexibility to continue participating in comedy, even in a small way.

Humour is important because it's the ultimate disarming tactic. I use it every day, whether that's with a patient, a colleague or while creating a skit for the annual Holland Centre staff holiday party. During my hospitalist fellowship, I made a  decision to take improv classes at Second City, and spent the summer performing in a show at a comedy club downtown.

Improv and practising medicine have more in common than many people realize. Most people think improv is a competition to see who is the funniest on stage, but it's really about letting your colleagues shine. Before going on stage, our comedy troupe had a tradition of putting our hands on each others' shoulders, looking each other in the eye and saying 'I will make you look good.'

The hard work of the nurses, the mobility efforts of physiotherapy, the safety assessments and disposition plans of occupational therapy and social work - there is no doubt we help each other shine.

Improv is all about working to help the other person on stage. Just like in medicine, there are many people contributing to one story, which needs to have a beginning, middle and end. Listening to those people and trusting them is so important. The risk is huge, but the payoff is worth it.

*– As told to Sybil Edmonds*

# DIRECTLY FOCUSED ON HEALING

Sunnybrook is pioneering the use of focused ultrasound to treat neurological disorders and cancers – without resorting to the knife

BY CELIA MILNE

# For 15 years, tremors controlled Tony Lightfoot's body.

The petrochemical engineer couldn't stop his arms from shaking. He got by at first; he typed instead of wrote and used two hands to steady his bowl of porridge in the morning. But the intensity of the tremors escalated; in meetings with clients, he couldn't turn the pages of a proposal without shaking. His driving became jerky. His wife helped dress and feed him. When he was nervous or stressed, his body would shake from his stomach through both arms. And there were uncontrollable spasms. "I would take something out of the fridge and think I had it, and then I'd throw it and it would be all over the kitchen," says Tony, 68. "It got so bad, I would cry at times."

Tony suffers from essential tremor. It is the most common type of movement disorder, affecting roughly three per cent of the population. It usually appears in late adulthood and often runs in families. Malfunctions in the thalamus, a part of the brain that relays information to control muscle movements, cause the tremors. Instead of being smooth and continuous, the signal running through the thalamus is jumpy.

Medication works for most people with essential tremor, but for some, including Tony, the symptoms return. The remaining options were brain surgery to interrupt the circuit with the "jumpy" signal causing the tremor or deep brain stimulation to turn it off, in which a pacemaker fires electrical signals into electrodes implanted into the faulty brain tissue. But he wasn't keen on open surgery. Instead, he turned to the Internet in search of something better.

A YouTube video changed Tony's life. The video showed how focused ultrasound treatment improved another man's essential tremor. The procedure concentrates beams of ultrasound waves onto an area no larger than a pinhead to heat and destroy the troublesome cells without cutting open the skull. Tony was impressed and started making calls. His persistence paid off; in December 2012 he joined a Canadian-first clinical trial at Sunnybrook to test the procedure's safety.

Only six people with essential tremor have been treated with focused ultrasound at Sunnybrook so far, but Dr. Michael Schwartz, head of the division of neurosurgery at Sunnybrook and the study's principal investigator, says the procedure appears to be safe and has very few side-effects. It requires no general anesthesia. "It's been really good for them, and it's very exciting for me," he says.

The difference in Tony's ability to complete simple tasks before and after the procedure *(continued on page 20)*



These photographs show the procedures that cured patient Tony Lightfoot's tremors by the pioneering use of focused ultrasound through the skull and into the brain. Middle of bottom row: Dr. Kullervo Hynynen (centre) and colleagues monitoring the treatment.


# **CeRIGT:** *The future is now*

Last November, after five years of planning and building, Sunnybrook Research Institute opened its Centre for Research in Image-Guided Therapeutics (CeRIGT), a $160-million centre of research excellence that is bringing medicine from the lab to patients. The teams here are developing and testing new ways to diagnose and treat cancer, heart disease, musculoskeletal disorders, immune deficiencies, stroke, dementia and other neurological conditions. The work being done in the centre covers the entire span of biomedical research – from basic research to clinical trials.

## TRANSLATIONAL RESEARCH FACILITY

*Rebuilding the body – cell by tiny cell*
In the Cellular and Molecular Regeneration and Repair Laboratory, scientists will develop cell-based repair kits from stem cells, undifferentiated cells that can develop into any cell in the adult body with the right coaxing. The aim is to help doctors rebuild immune systems knocked down by HIV, cancer or the toxic effects of chemotherapy, heal burns and wounds, and treat cancer with carefully selected cells – and they'll watch the recovery live.

*Small but deadly effective*
Sunnybrook Research Institute's first chemistry laboratory, the Molecular Targeting and Therapeutics Laboratory, will help turn the sci-fi movie the *Fantastic Voyage* into reality. Scientists in the lab will create new molecules that can be harnessed to deliver drugs and vaccines, or help doctors see inside the body to treat cardiac and neurological diseases. They'll also design image-guided microbubbles and drug-coated nanostructures that target the molecular "signature" of a disease and let clinicians know if a treatment is working.

## PRECLINICAL TESTING FACILITY

*Breaching the brain's fortress*
The brain is like a fortress, protected from potentially harmful chemicals by a barrier of cells that separate it from the circulatory system. But this almost impenetrable fence — the blood brain barrier — also shuts out potential therapies for brain diseases like Alzheimer's disease and brain cancer. Scientists are using MRI-guided focused ultrasound therapy in the Biomedical Imaging Research Suite to temporarily disrupt the barrier and deliver therapeutic genes or drugs to the brain. All without cutting into the skull or the brain.

*Gizmos R Us*
The Device Development Laboratory is the first of its kind in a Canadian hospital. Outfitted with a waterjet cutter and rapid prototypers, all inside an advanced machine shop, it allows scientists and engineers to design and produce devices that will detect disease, deliver therapy and guide treatments.

*Quality control*
Every cell-based repair kit needs to hold the right tools — and they need to work and be safe. That's where the Current Good Manufacturing Practice (cGMP) Laboratory comes in. The research teams here are making new therapeutic cells and vaccines that target diseased cells, while ensuring everything they manufacture in the lab is safe, pure and effective to test in patients.

*Image-guided surgery*
When patients don't need invasive surgery they have better outcomes, fewer complications and shorter hospital stays. The Image-Guided Surgery Facility combines MRI, ultrasound, X-ray, computerized tomography and state-of-the-art surgery suites to give scientists the opportunity to develop and test new techniques to treat musculoskeletal, cardiovascular and brain diseases, and cancer. Open-heart surgery may soon be a thing of the past.

## CLINICAL RESEARCH FACILITY

*The beat goes on...*
The heart is an electrical organ, each heartbeat triggered by a tiny electrical current that stimulates its walls to contract. Sometimes the heart gets out of step and beats at an irregular rhythm, which can be serious or life threatening. In the Minimally Invasive Electrophysiology & Vascular Procedures Centre researchers are exploring ways of using magnetic resonance imaging to help guide them into and through the heart to fix these arrhythmias.

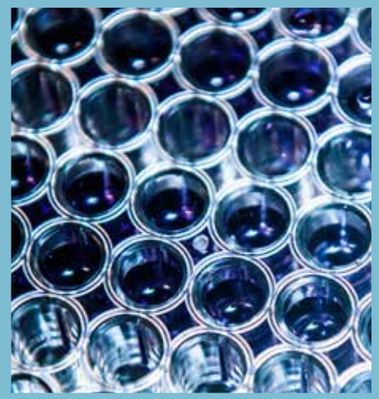
*Neurointervention invention*
Scientists in the Neurointervention Centre are inventing new ways to treat brain disorders such as stroke and dementia – and to help stroke patients recover faster. Studies are focusing on how to help stroke patients recover their balance and mobility, the effect of exercise on the brain and the therapeutic effect of transmagnetic stimulation in stroke.

## TREATMENT PLANNING, ANALYSIS & EVALUATION FACILITY

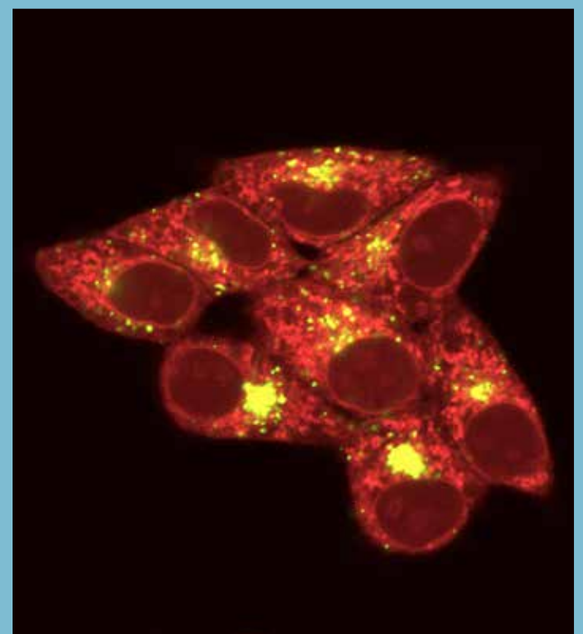
*Clinical Intelligence Agency*
Wouldn't it be nice to see exactly what a drug or a device is doing — to make sure it's working? The Image-Processing Laboratory and the Biomarker Imaging Research Laboratory will let scientists spy on cancer or brain and cardiac functions, and collect and analyze the fingerprints of disease.

The first lab gathers all Sunnybrook Research Institute scientists and engineers working on image-processing techniques to form a critical mass of talent that is by far the largest in the region. The Biomarker Imaging Research Lab gives research teams the capability in 3-D histopathology techniques they need to advance their work across many clinical areas, including cancer, brain sciences and cardiovascular, and is a fundamental resource within the Centre for Research in Image-Guided Therapeutics.

*- Hannah Hoag*



*Innovation in action on the M7 research floor at Sunnybrook. Clockwise from top: Technician Tanya Barretto adds media to a stem cell culture to promote growth; BCA reagents used in protein analysis; a drill press in the Device Development Lab; researchers use a Polarization Controller device to check on the performance of catheters; human breast adenocarcinoma (MCF-7) cells stained with Cell Tracker Orange for analysis; cuvettes used for bacteria transformation; model of a heart created by 3-D printer, used to develop new cardiac devices.*



CONTINUED FROM PAGE 16

is stunning. He couldn't drink from a cup without spilling, nor could he draw a spiral; his pen only jabbed at the paper. But immediately after the doctors had burned a tiny hole in his brain, he was able to move his arm without shaking. "It was wonderful. I couldn't believe it," he says. "They asked me to write and I wrote for the first time in 10 years."

Sunnybrook is one of only a few centres in the world with the technology to deliver focused ultrasound. The scientists and clinicians at Sunnybrook's Centre for Research in Image-Guided Therapeutics (CeRIGT) are finding new ways to deliver non-invasive treatments to hard-to-reach parts of the body without general anesthetic or the risks of traditional surgery, such as bleeding or infection.

Imaging technologies such as ultrasound and magnetic resonance imaging (MRI) have been used largely to diagnose health problems. The idea of using ultrasound to destroy millimetre-sized bits of tissue has been around for a while, but it remained impractical because doctors couldn't precisely aim the energy beam. MRI gave doctors the richly detailed view of the inner body they needed. Together, MRI and focused ultrasound offer the possibility of healing without cutting.

But neurosurgery remained a challenge. "The skull surrounds the brain, and most of the ultrasound energy is absorbed by the skull itself," says Dr. Schwartz. The skull would heat up and disrupt and weaken the beam. Dr. Kullervo Hynynen, head of CeRIGT and Director of physical sciences at Sunnybrook Research Institute, found a solution. He pioneered the use of MRI to guide focused ultrasound to destroy damaged brain tissue by creating a helmet-like device called a hemispherical transducer. It focuses the ultrasound beams into the brain in much the same way a magnifying glass concentrates sunlight into one spot. He also designed a cold-water cap to keep the head from heating up.

Almost nothing is left off the list of potential targets. Dr. Schwartz says he hopes to adapt the procedure to treat trigeminal neuralgia, a shooting debilitating pain in the face. Other studies are looking at whether the technique can be used to temporarily open the blood-brain barrier that normally protects the brain from foreign molecules to allow medicine into the brain to treat tumours, Parkinson's and Alzheimer's diseases. In addition to brain applications, the CeRIGT research teams are developing high-intensity focused ultrasound to treat cancers that have spread to the spine and uterine fibroids (painful non-cancerous tumours).

Focused ultrasound treatments offer a glimpse of the future of medicine, a way to erase a damaged piece of tissue deep inside the body, keeping the rest unblemished. "The only limit is the imagination," says Dr. Schwartz.

# AN EARLY ASSAULT ON PROSTATE CANCER

Dr. Robert Nam's team is leading the fight against the disease, from early detection and surgery to genetic research and prevention

BY CELIA MILNE

Prostate cancer survivor Stan Rosenberger is healthy and back in the saddle of his motorbike.

PHOTOGRAPH TIM FRASER

# STAN ROSENBERGER IS A GUY'S GUY.

The Bradford, Ont. resident has stereotypically masculine hobbies: motorcycle trips with his buddies, rebuilding a 1949 Ford Thames – complete with V8 engine – and camping in the northern wilderness. He was born and raised in northern Alberta on a beef cattle farm, operated heavy equipment and was a truck driver for a family owned construction company. He now inspects heating, ventilation and air conditioning systems.

Stan also has what he calls "man problems." He was born with a genetic propensity toward prostate cancer and didn't know it.

If it hadn't been for astute doctors at Sunnybrook, he might still have a ticking time bomb in his body. Two years ago, Stan's wife was very ill, and while she was having blood tests, he agreed to have a checkup at his general practitioner's office in Newmarket. "That's when I found out my PSA was through the roof," he says of the prostate-specific antigen test.

Stan saw a local specialist, who put him on medicine to treat prostatitis, a swelling of the prostate gland. But Stan felt there was more that needed to be done. "I didn't get a great feeling about it. It was like a fishing expedition – throwing a hook into the water in hopes to find something that would lead me to seek a second opinion."

Research by his sister-in-law, a nurse practioner, led Stan to Dr. Robert Nam, head of genito-urinary cancer care at Sunnybrook's Odette Cancer Centre. After he was referred to Dr. Nam by his family doctor, things began to move quickly: Dr. Nam saw him within five days and was concerned enough to order a biopsy immediately. Just days later, Stan was diagnosed with an aggressive form of prostate cancer, which needed treatment right away. He and his wife and their two adult children were shocked. "I had no symptoms, absolutely nothing. I felt healthy," he says.

While the diagnosis was devastating, Stan felt at ease with Dr. Nam. "I just really like his style. He is so sensitive and so genuine. He is more like a friend than a doctor," says Stan.

Stan agreed to a radical prostatectomy – complete removal of the prostate gland and surrounding tissue – in May 2011. He was 49. Possible risks of the procedure include erectile difficulty and urinary incontinence. "It's a delicate operation," says Stan.

"Someone told me the tissue is very thin. It's like sewing together wet toilet tissue." Before being anesthetized, he joked with Dr. Nam, "I have full faith you'll take care of me. Just don't make me into a she."

Dr. Nam's deft craftsmanship worked wonders. "All I can say is, his nerve-sparing procedures work. My equipment still works, not like it used to, but it still works," says Stan. "I feel very fortunate."

Why did this young, healthy man get prostate cancer? Stan had two uncles on his mother's side with the disease, but didn't realize the risk could be passed down the female side of the family.

Identifying families at risk and determining which men will have aggressive forms of this disease are two of the ways Sunnybrook is leading prostate cancer care.

Prostate cancer is relatively common. About 26,500 men are diagnosed each year in

**"THE BEAUTY OF SUNNYBROOK IS THAT INNOVATION REALLY PAYS OFF."**

DR. ROBERT NAM
HEAD OF GENITO-URINARY CANCER CARE

Stan Rosenberger on Dr. Robert Nam, shown here in surgery: "I just really like his style. He is so sensitive and so genuine."

Stan Rosenberger works on his beloved 1949 Ford Thames.

PHOTOGRAPH TIM FRASER

**"I WILL GET SCREENED EARLIER THAN A TYPICAL PERSON WOULD. SUNNYBROOK WOULD BE MY CHOICE, BECAUSE OF THE SUCCESS MY DAD'S HAD."**

MICHAEL ROSENBERGER,
SON OF STAN ROSENBERGER

Canada, and 4,000 die of the disease. According to Dr. Nam, about 10 per cent of men inherit the disease and another 20 per cent have an identifiable risk factor, such as being of Western African or Caribbean descent, having a strong family history or having the BRCA1 or BRCA2 genes. The remaining 70 per cent are sporadic cases that he calls "unlucky" – the cancer seems to come out of nowhere.

Sunnybrook's team leads the way along the whole continuum of care for all groups, from genetic research to early detection, surgical and radiation services, education and prevention.

Besides being a dexterous surgeon, Dr. Nam is a world-class researcher. He and his team at Sunnybrook Research Institute recently led research that will help clinicians determine which of the 70 per cent of men whose prostate cancer is sporadic need to be monitored more carefully.

His team scanned the whole genome and found a panel of micro-RNAs (genetic signatures in the blood) associated with a more tenacious type of cancer. "With that tool," says Dr. Nam, "we have a test that is very predictive of aggressive disease. We can say, 'This guy is going to do poorly versus another who won't.' That's huge."

He also recently led a discovery that will change how genetic risk for prostate cancer is calculated. He discovered a rare genetic mutation on the HOXB13 gene strongly associated with prostate cancer risk. A new genetic test will help identify men who have the mutation, called G84E. "Patients with this mutation have 14-fold higher risk for prostate cancer," says Dr. Nam. The team's results were published in the prestigious Journal of the National Cancer Institute.

Another leading expert in prostate cancer at the Odette Cancer Centre is radiation oncologist and researcher Dr. Danny Vesprini. His work focuses on the 20 per cent of men at high risk of developing prostate cancer because they have a mutation in one of the BRCA genes, a strong family history of prostate cancer or are of Western African or Caribbean descent. "These men tend to develop aggressive disease at a younger age and therefore have a shortened life expectancy." The group is working to identify biomarkers – signs of disease in the blood and urine – that help explain why these men have a poorer prognosis, and ultimately provide a screening tool to detect the disease earlier, before it becomes aggressive and threatens their life.

Dr. Vesprini and genetic counsellor Justin Lorentz are leading a collaborative research team with researchers from Princess Margaret Hospital and Women's College Hospital in Toronto to build a registry of men known to have BRCA1 or BRCA2 mutations, and this will eventually expand across Canada.

Dr. Vesprini is also leading a clinical study to determine whether the use of state-of-the-art magnetic resonance imaging screening of the prostate gland can help to identify cases in high-risk men before their disease becomes aggressive.

The pan-Canadian collaborative group will also develop clinical trials using new medications that target DNA repair in prostate cancers with a BRCA1 or BRCA2 mutation.

"We're going to detect prostate cancer that has the potential to become aggressive earlier so that it can be dealt with promptly, while also indentify those men with low risk disease that can be safely watched with active surveillance. This approach will ultimately improve survivorship outcomes in prostate cancer," says Dr. Vesprini.

Cutting-edge research translates into practical solutions in real time. Sunnybrook's Prostate Risk Calculator is online at prostaterisk.ca to help clinicians rate a patient's risk. "The beauty of Sunnybrook is that innovation really pays off," says Dr. Nam.

For Stan Rosenberger's 23-year-old son, Michael, these advances are good news. The musician and business student at the Laurentian University campus in Barrie knows he is at increased risk for developing prostate cancer. "I will get screened earlier than a typical person would," he says. "Sunnybrook would be my first choice, because of the success my dad's had."

Although it was a difficult time, Stan speaks fondly of his four 46-kilometre trips to Sunnybrook from Bradford for prostate cancer diagnosis and treatment. "I can't say enough great things about the way I was treated at Sunnybrook, from the parking lot attendant, coffee bar staff, an amazing office administrator [Jen], and interns. Dr. Nam's office runs like a fine tuned machine. It is quite a place down there – so large and yet so welcoming."

## PROGRAM VISION

Delivering patient-focused care is at the heart of what the **Odette Cancer Program** does. The future of this care is two-fold: earliest possible diagnosis and the destruction of disease while affecting healthy tissue as little as possible.

This means we will continue to drive the advancement of imaging and other diagnostic tools. We will continue to pioneer minimally invasive ways to remove or "ablate" cancers. We will become ever more pin-point precise with surgery, radiation therapy and other forms of energy. We will design treatments tailored exclusively to the DNA of the patient.

All of this will lead to better outcomes for patients: less time in hospital, less time recovering from surgery and fewer treatments. In short, our goal is to get people back to health and to their lives as quickly as possible.

Diagnosis and treatment are the foundation of the care we offer, but they are not enough. Every one of our patients is a person with a life beyond their time with us. We will expand the supportive care – emotional, social and nutritional – offered to patients and their families during every stage of the cancer journey.

With Sunnybrook's donor community behind the Odette Cancer Program, we will achieve our vision. Together, we will save and improve lives.

*Dr. Andy Smith,*
*chief of the Odette Cancer Program*

### ACCELERATING THE PACE OF INNOVATION IN CANCER

**THE GOAL:**
Minimally invasive treatments for cancers we can see before they threaten a life

**WHAT WE NEED TO GET THERE:**

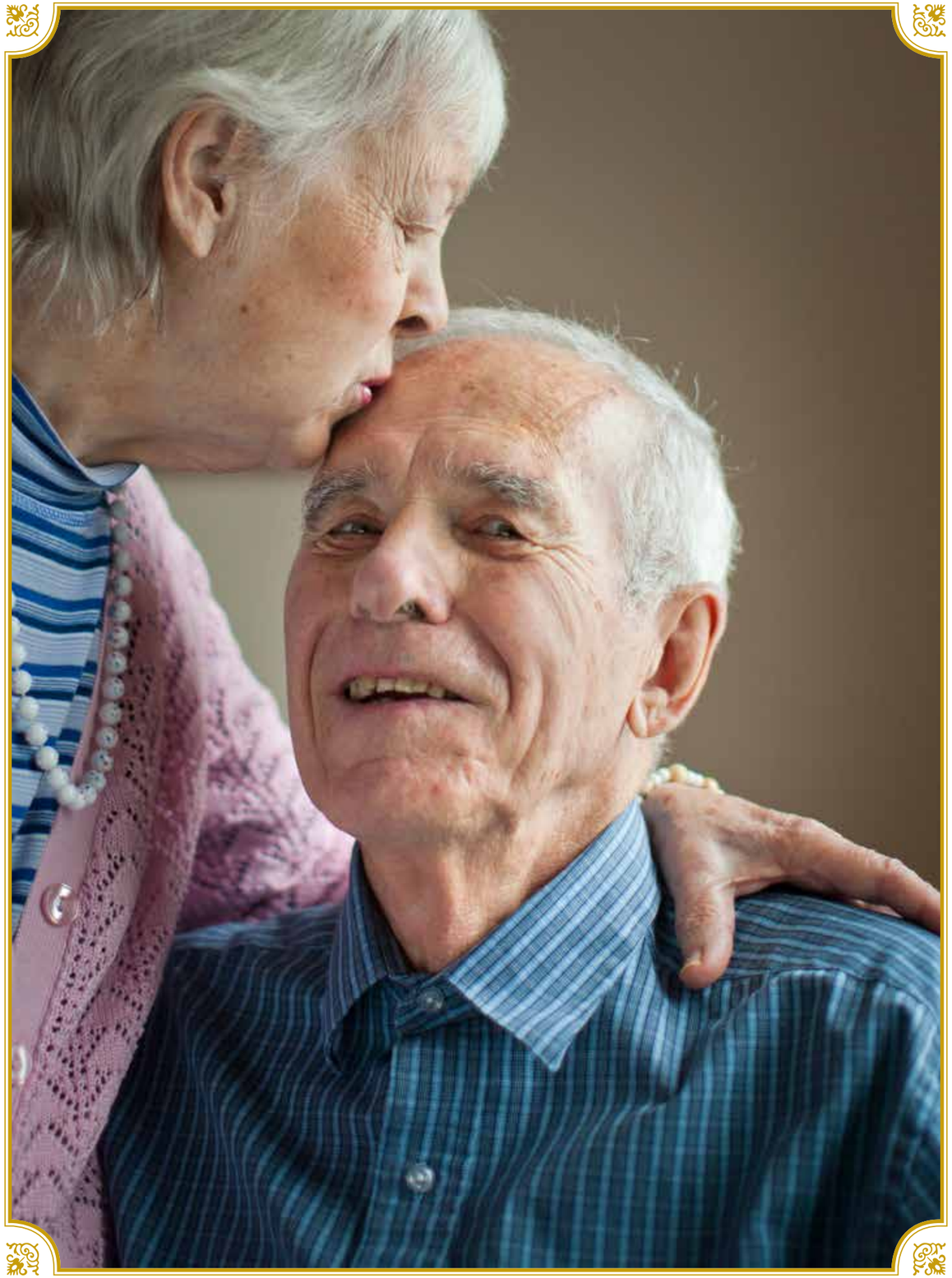
- Research and facilities for image-guided surgical techniques to remove tumours without making large incisions to remove as little healthy tissue as possible
- Equipment for image-guided radiation so treatments can be pin-pointed on diseased tissue, leaving healthy tissue untouched
- Rapid biopsy clinic so diagnosis can be made as quickly as possible because time affects the outcome
- New support unit for patients and families that will bring together a team to treat the patient's mind and body and guide families through their experiences
- On-going research in the causes and treatments of prostate, breast and colorectal cancers; customized one-of-a-kind treatments for individual patients; and, patient and family education

**HOW YOU CAN HELP:**
Invest in these and other innovations at sunnybrook.ca/HealNow

# Hearts of GOLD

If the stent revolutionized heart care, the groundbreaking **TAVI** treatment has raised the bar again. But it took the generosity of donors to ensure the program could continue saving lives

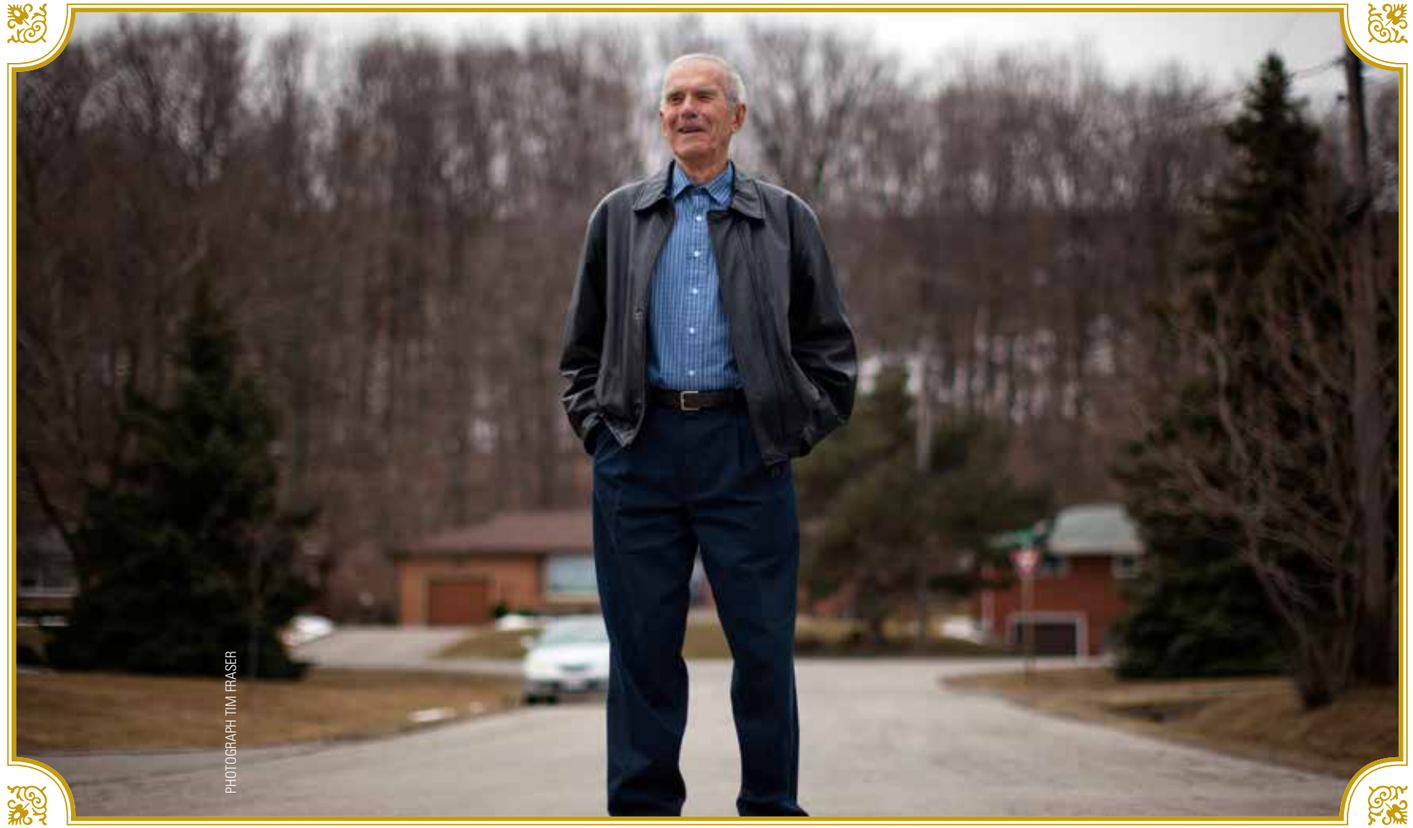
BY L.H. TIFFANY HSIEH



PHOTOGRAPH TIM FRASER

TAVI patient Gordon Golding at home with wife Joan.

It's the middle of the afternoon and Gordon Golding is over the moon. He has just visited Joan, his wife, and taken her to get her hair done. "I visit her every day without fail. She sees me, she walks across the room and she gives me the biggest kiss you've ever seen," Gordon says.



PHOTOGRAPH TIM FRASER

But were it not for a leading-edge procedure offered at Sunnybrook four years ago, Gordon might not be around to care for Joan today. At the time, doctors told Gordon he had less than 10 months to live. The then 76-year-old of Stoney Creek, Ont. needed an aortic valve replacement. Having had a heart bypass before, he was not a good candidate for a conventional open-heart surgery.

"So what was I supposed to do – sit in this chair and wait until I fall off?" Gordon says. "I really thought that was going to happen to me. I couldn't breathe. I couldn't even carry the garbage out to the driveway." Joan was with him every step of the way.

Through doctor referrals, Gordon came to Sunnybrook and learned of a new procedure called transcatheter aortic valve implantation (TAVI). Even though fewer than 3,000 patients in the world had undergone TAVI at the time, cardiologists at Sunnybrook were confident this innovative minimally invasive procedure, which requires no opening of the chest, would save Gordon's life.

"I had to believe it was going to work – I had no choice," Gordon says.

In the fall of 2009, Gordon became Sunnybrook's first TAVI patient. He was in and out of the hospital in four days, with Joan by his side. "Doctors told me they couldn't ask for anything better," Gordon says.

Joan has since been diagnosed with Alzheimer's disease. Thanks to TAVI, Gordon has been able to care for her and spend time with their three children and five grandchildren.

"Who would be here to look after my wife if I wasn't?" Gordon says. "I'm grateful for the TAVI team and the expert care I received. Simply, I'm grateful for being here. I wake up every morning and every breath I take, I thank Sunnybrook."

Gordon's story is one of many that wouldn't otherwise be told if TAVI wasn't an option to elderly or frail patients not well enough to undergo open-heart surgery. Over a three-year period, the physicians at Sunnybrook's Schulich Heart Centre saved 150 lives with this procedure, which, until January 2013, was entirely funded by generous donor support.

Before TAVI, one-third of patients who needed an aortic valve replacement couldn't be treated. Conventional open-heart surgery was too risky. The staggering number and increasing demand for an alternative minimally invasive treatment prompted Dr. Bradley Strauss to establish a viable TAVI program at Sunnybrook.

"In my more-than-20 years of practice, I've seen two revolutionary game-changing therapies. Stent was first, now TAVI," says Dr. Strauss, then head of cardiology and now also chief of the Schulich Heart Centre.

TAVI allows doctors to insert a catheter into an artery in the groin, through which they are able to reach the aortic valve that has been partially blocked, impairing flow of oxygen-rich blood to the rest of the body. If left untreated, the patient's heart muscle can thicken, as it works harder to pump blood through the body, and potentially lead to heart failure.

Susana Remeny-Prentice was at death's door when, as she describes it, "a true miracle of modern medical advancement, brilliant surgical skills and blessings from above" saved her.

A professional harpist and teacher at the Royal Conservatory of Music in Toronto, Susana woke up one night in October 2011, making strange snoring sounds and gasping for air. Later diagnosed with congestive heart failure, her condition deteriorated rapidly and the outlook was bleak.

Due to her petite frame and space constraints in her aorta, Susana was not an ideal candidate for open-heart surgery. But thanks to TAVI, she has returned to playing the harp and teaching.

"I am thankful and proud to be living proof that TAVI is destined to spread around the world to allow thousands upon thousands more to join my growing team of 'miracle survivors,'" Susana says. "TAVI saved my life."

In 2009, while returning home from Israel where he was visiting one of his trainees perform a TAVI procedure, Dr. Strauss came to the conclusion TAVI is a must-have for Sunnybrook. "It wasn't a question of should or should not," he says. "Whatever we needed to do, we had to get it done."

Aside from getting the hospital and the manufacturer of the surgical device onboard, funding was a major challenge in getting the program started. TAVI was so new, the Ministry of Health and Long-Term Care didn't cover the cost, about $35,000 per procedure.

"It's like having no money in the bank and having to buy something," Dr. Strauss says. "I actually went to people's houses and called them. It was direct solicitation – there was no other way. I was begging for money to do something good. It was not for me."

Dr. Strauss approached friends and patients. One wrote a cheque for $100,000, another for $25,000. With the help of Sunnybrook Foundation and a fellow cardiologist at the Schulich Heart Centre, Dr. Brian Gilbert, $200,000 was raised in a matter of months. It was enough to get TAVI off the ground, but more was needed.

"We had to find money creatively, and we did so through asking and through events like the Sunnybrook Golf Classic," Dr. Strauss says. "We knew if we had stopped, it'd have a bad effect on the program."

"Every breath I take, I thank Sunnybrook."

TAVI patient Gordon Golding

PHOTOGRAPH DOUG NICHOLSON

Benefactor Irving Ungerman (left) with patient George Bilikopoulos

With the seed money secured, a team of nurses, surgeons, interventional cardiologists and anesthetists was assembled. Under the direction of Dr. Sam Radhakrishnan, interventional cardiologist and director of cardiac catheterization labs, and Dr. Stephen Fremes, a cardiac surgeon at Sunnybrook, TAVI headlined minimally invasive treatments at the Schulich Heart Centre – one of the first in the country to establish such a program. Patients who benefitted from the procedure regarded it as a divine intervention.

Others, like Irving Ungerman, reckoned if it saves lives, money should be no object.

The famed Canadian entrepreneur, art collector, boxing manager and promoter came to Sunnybrook in May 2010 for a stent operation and shared a room with three other patients; one of them was George Bilikopoulos of Lindsay, Ont.

George was a TAVI candidate and desperately needed the procedure. Without it, doctors gave him six months to live. Upon learning George's condition, Irving was inspired to contribute to the TAVI fund.

"I told Dr. Gilbert before I went in for my operation, 'Win, lose or draw, you'll get my $30,000 tomorrow,'" Irving recalls. "The next morning, my wife gave Dr. Gilbert a cheque. I just felt money means nothing – it could ruin you or make you. But ultimately, it could save a life."

Irving, 90, and George, 80, have since become good friends. For George, there are no words that can describe his gratitude toward Irving, whose kind gesture to help TAVI patients felt like a personal one.

"If you can have a picture of my heart, you'll see how I feel about this guy. I can't forget him – can I kiss you?" he says, turning to Irving. "Ever since the procedure, I can't stop moving – I feel so young."

With the help of donors like Irving, a total of $2.5 million raised for TAVI surgical devices has made Sunnybrook one of six sites in Ontario to receive government funding for the program. The investment has also allowed the Schulich Heart Centre to expand its leadership role in TAVI research and education here and abroad, with doctors from six Canadian centres, as well as from Scotland, Israel and Japan, visiting Sunnybrook to start their own programs.

# The **MITRACLIP** miracle

"If they can put a man on the moon, why not a minimally invasive way to repair a mitral valve?" Therese Rashotte wanted to know.

A retired nurse in Toronto, Therese was well aware of the risks associated with open-heart surgery and wanted to avoid it when it came time to repair her mitral valve from leaking blood backward into the heart.

"I'd be out of breath after walking one block – and I'm usually a fast walker. It all happened so fast, I was worried because it kept getting worse," she says.

Mitral regurgitation is one of the most common heart valve diseases in Canada. Not unlike what TAVI does for the aortic valve, MitraClip is a simple device that allows doctors to repair faulty mitral valves without opening the chest, providing a new option for patients with severe symptoms. At about $36,000 per procedure, it is currently not funded by the province and dependent on donor support.

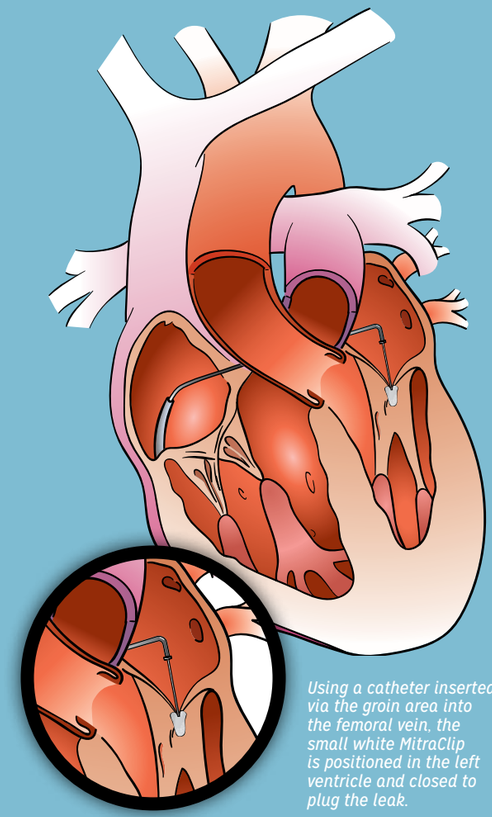
However, with Sunnybrook setting the standard of care for minimally invasive heart procedures, doctors and patients are optimistic donor support will pave the way for MitraClip funding from the province in the near future.

Since April 2011, Sunnybrook has performed 25 MitraClip procedures. Led by Dr. Eric Cohen, deputy chief of the Schulich Heart Centre and the cardiology division, and Dr. Gideon Cohen, head of the cardiovascular surgery division, Sunnybrook was the first in the province to start a MitraClip program. It remains the only site in the Greater Toronto Area and one of only four in the country to offer patients like Therese a second chance in life.

"I knew if they could use the MitraClip, I'd be able to breathe so much easier," says Therese, a MitraClip candidate who had her procedure in July 2012, with the two Cohen doctors in charge.

Since then, she is back to spending more time with friends, and back to routine.

"To me, it was like a miracle – I was in one day and out the next; it was like nothing was done," she says. "I'm so glad I found Sunnybrook and Dr. Cohen-times-two – that was my miracle. I feel great, but I'm more grateful than great."



*Using a catheter inserted via the groin area into the femoral vein, the small white MitraClip is positioned in the left ventricle and closed to plug the leak.*

## THE PERCEVAL VALVE

Similar to TAVI, the sutureless, self-expanding Perceval valve is a new option for high-risk patients needing an aortic valve replacement, but at a fraction of the cost. While a surgeon still needs to make a cut to the patient's chest in this procedure, the Perceval valve doesn't need to be sewn in. It clips on, which leads to fewer complications and patients are less likely to have heart failure later.

Sunnybrook was the first in North America to perform the procedure about a year ago. Since then, 16 patients have benefitted from the Perceval valve, which costs $12,000 each and is so far funded 100 per cent by donors. The regular valve used in the traditional aortic valve replacement surgery costs $3,500 and is funded by the government.

## LEFT ATRIAL APPENDAGE OCCLUSION

With donor support, the Schulich Heart Centre plans to initiate a program to prevent strokes in patients with atrial fibrillation, a common heart rhythm disorder. While the traditional treatment has been to take a blood thinner on a permanent basis, some patients can't do this because they might already have a bleeding problem; others simply opt not to take a blood thinner.

An alternative approach is to place an occlusion device in the left atrium to seal off the opening of the pouch, trapping any clots inside and preventing them from getting to the brain or other vital organs. This can now be done by a minimally invasive catheter-based procedure, in which doctors insert the device through a vein in the leg, advance it to the left atrium, and implant it in the correct position.

The cost for this procedure is approximately $15,000, including about $12,000 for the device. It's available in Europe and at a limited number of hospitals in Canada. The goal for Sunnybrook is to perform 15 to 20 procedures per year.

## PROGRAM VISION

One thing I tell patients is: "You'll get your life back again."

The Schulich Heart Centre has a reputation for cardiac care. As a centre of innovation, we plan new procedures using new devices. We take our ideas and develop therapies for patients – that's very novel and innovative. It's a programmatic focus that'll improve patient care, and we have the infrastructure to help future innovators develop their ideas. That is what makes the Schulich Heart Centre unique.

Our recent success with transcatheter aortic valve implantation (TAVI), which repairs diseased heart valves without opening the chest, has resulted in the province funding this minimally invasive procedure. We owe that success to our donor community. It's because of their generous investment that we have been able to expand our TAVI program clinically and in research, and change the way heart patients are treated.

We will continue to focus on minimally invasive image-guided therapeutics. Our experts are pioneering a growing mitral valve program, as well as other new structural heart programs including a sutureless valve that allows surgeons to implant an aortic valve, a device that will help prevent strokes in patients with atrial fibrillation, and a new therapy aimed at lowering blood pressure.

My research on collagenase, an enzyme used to soften arterial plaque, is also very important. As a leader in angioplasty and stenting, Sunnybrook will be one of the key sites with a program to treat patients with totally-blocked coronary arteries. While we aim to deliver advanced technical procedures, ensuring we do the least risky surgery whenever possible, it's equally important to treat patients and their families with respect and kindness and allow them to resume their lives.

*Dr. Bradley Strauss, Chief, Schulich Heart Centre*

### ACCELERATING THE PACE OF INNOVATION IN HEART CARE

**THE GOAL:**
Minimally invasive treatments for heart and circulatory disease we can see before they threaten a life

**WHAT WE NEED TO GET THERE:**
- State-of-the-art minimally invasive heart surgery suites
- Advanced imaging equipment to look inside the heart and circulatory system to find and treat disease
- New devices to repair hearts by using minimally invasive techniques
- Application of minimally invasive heart treatments to other areas of the body to prevent loss of limbs from diseases like diabetes
- Heart assessment centre that is a one-stop shop for non-emergency cardiac patients for diagnosis and consultations with medical staff
- Ongoing research in advanced imaging, new devices and minimally invasive treatments

**HOW YOU CAN HELP:**
Invest in these and other innovations at **sunnybrook.ca/HealNow**

Change the outcome.
Heal the future.
Sunnybrook

PHOTOGRAPH TIM FRASER

"I am thankful and proud to be living proof that **TAVI** is destined to spread around the world. **TAVI** saved my life."

TAVI patient Susana Remeny-Prentice

"Looking back, a lot of it was trust when we first asked people for money," Dr. Strauss says. "It's a wonderful program and one of the questions in the future is whether TAVI will be restricted only for those patients who aren't well enough to undergo the traditional aortic valve replacement surgery. We still do not know whether TAVI should be offered to patients as an alternative to open-heart surgery, even when they are good candidates for the conventional surgical approach. That's the question that is currently being investigated and Sunnybrook is fully involved in this research."

# //CODE ORANGE

Toronto's horrific Danzig Street mass shooting made for a night of intense drama at Sunnybrook's trauma centre

By Tamara Baluja

// Paramedics attend to a gunshot victim at the scene of the Danzig Street shooting.

PHOTO COURTESY MANNY RODRIGUES

**// DR. HOMER TIEN WAS ALMOST AT THE END OF A LONG SHIFT WHEN HIS PAGER WENT OFF. IT WAS JULY 16 – THE NIGHT OF WHAT IS NOW INFAMOUSLY KNOWN AS THE "DANZIG STREET SHOOTING" – AND DR. TIEN WAS SUNNYBROOK'S SURGEON-ON-CALL.**

Two people were killed that night in 2012, and 24 others wounded in the worst mass shooting in Toronto's history. Gangs were blamed for the outbreak of violence that erupted at a street barbeque in the Scarborough neighbourhood.

The hospital was put on step 2 of Code Orange – high alert status that meant casualties were coming in. Initial reports said 20 patients with gunshot wounds were headed to Sunnybrook – and it was Dr. Tien's job to get everyone into action.

When he arrived in the emergency room around 11 p.m., the head emergency nurse was on the red phone with EMS dispatch on the scene of the shooting, trying to get a handle on the number of casualties coming to the hospital.

"The numbers kept changing and we had no idea how many patients were coming to the hospital, or what condition they were in," recalls Dr. Tien, medical director of the Tory Regional Trauma Centre. "We were preparing for the worst and just hoping we would have the resources to meet the needs that night."

Six of the most critical patients – five with gunshot wounds and one person who was trampled – were immediately transferred to Sunnybrook.

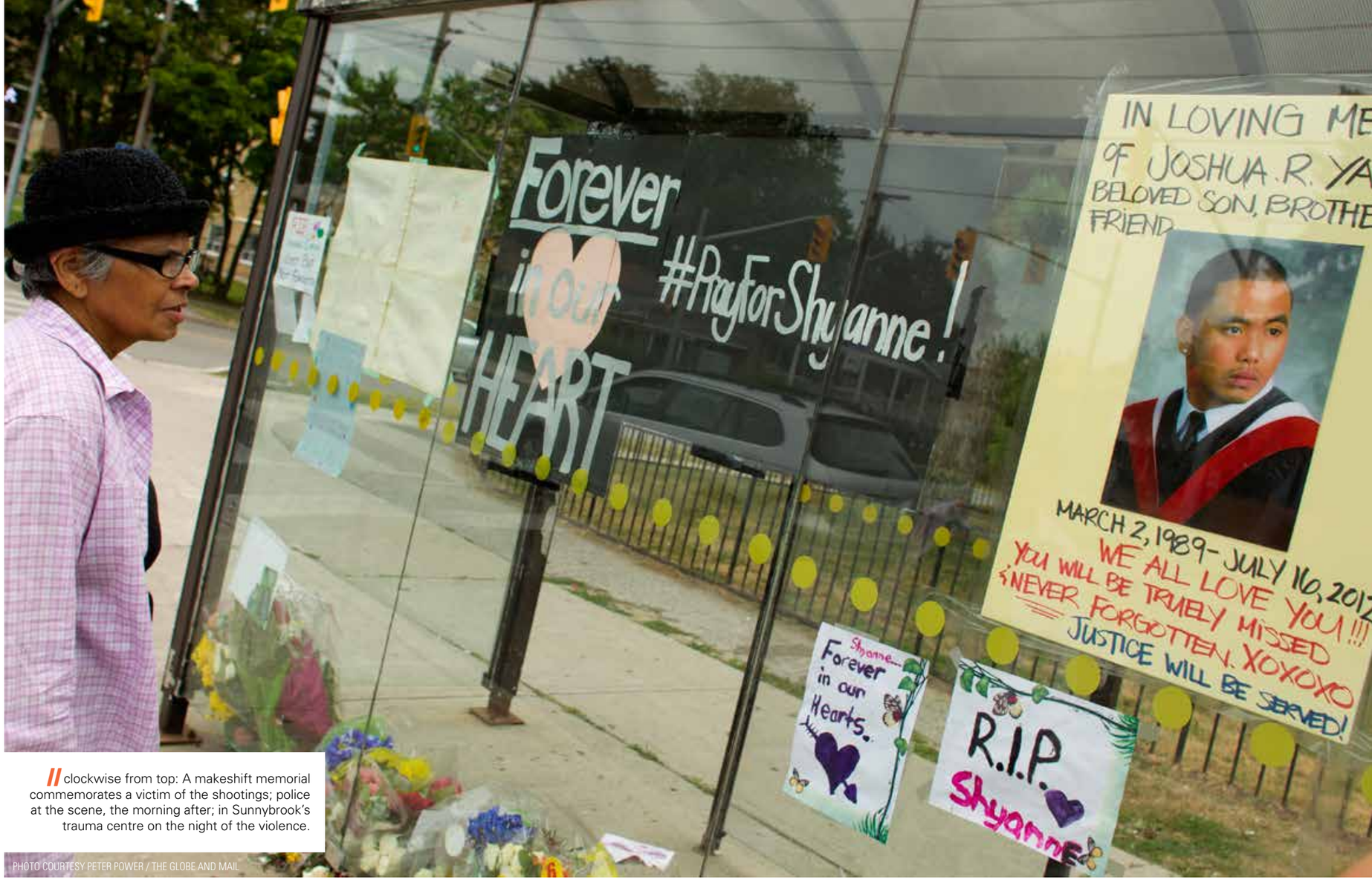
As a major trauma centre, Sunnybrook staff regularly deal with multiple traumas. The trauma centre sees three to four patients per day, or approximately 1,250 trauma patients every year. But six patients in a short time span was a unique circumstance and the first time Dr. Tien activated the full Code Orange, a special alert for mass casualties at Sunnybrook.

(Sunnybrook had put itself on step 1 of Code Orange before as a precaution, when an Air France flight skidded off a runway at Toronto's Pearson Airport in 2005, for example. Sunnybrook staff practised mock Code Orange scenarios for mass incidents in preparation for the G20 summit in Toronto, but this is the first time the Code Orange actually coincided with casualties coming to Sunnybrook.)

During the Danzig Shooting aftermath, Dr. Tien estimates close to 100 staff – including physicians, CT scan specialists, nurses, residents and security staff – were involved in the response.

The first ambulance arrived just after 11 p.m. and five more ambulances pulled up in the next 30 minutes. As the lead trauma surgeon, Dr. Tien likens his role to a traffic cop directing staff to treat patients. He also organized triage, prioritizing patients according to the severity of their injuries.

Dr. Tien assigned three teams of ER physicians, nurses, residents and medical students to the trauma room where they operated on patients needing resuscitation in addition




// clockwise from top: A makeshift memorial commemorates a victim of the shootings; police at the scene, the morning after; in Sunnybrook's trauma centre on the night of the violence.

PHOTO COURTESY PETER POWER / THE GLOBE AND MAIL

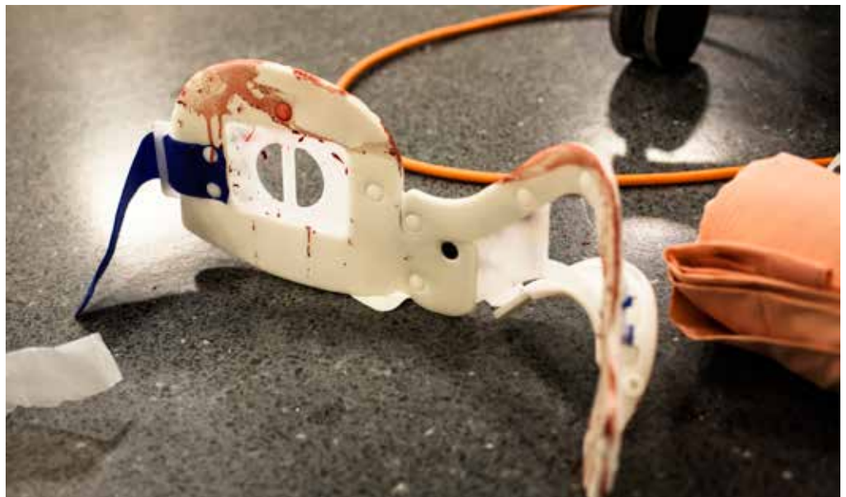



PHOTO COURTESY DEBORAH BAIC / THE GLOBE AND MAIL

## PROGRAM VISION

As Canada's first and largest regional **trauma** centre, Sunnybrook brings a remarkable amount of expertise to caring for the province's most seriously injured patients when seconds count.

Our vision is to create a trauma centre without walls.

In the earliest phase of trauma, there is no time to move patients who require multi-disciplinary care between care sites. Instead, we will bring tools to them in a multi-purpose room, which can seamlessly integrate medical expertise, patient data and research findings, breaking down walls between clinical silos, researchers, policymakers, community physicians and the trauma centre.

As a leader in trauma care, we envision a research and policy program that will focus on injury prevention and control. We will look at ways to build better homes, cars, appliances and roadways. By bringing together professionals from a wide spectrum of disciplines to perform research and provide technical expertise, we hope to minimize injuries and violence.

We are not a high-tech program, but a high-touch program. Trauma, emergency, and critical care are complex systems. Optimizing those systems using research from Sunnybrook investigators doesn't require robots or lasers but it will save lives. It sounds easy, but it's a lot harder to do.

*Dr. Gordon Rubenfeld,*
*Chief of Trauma, Emergency and Critical Care*

### ACCELERATING THE PACE OF INNOVATION IN TRAUMA AND CRITICAL CARE

**THE GOAL:**
Save the lives of Ontario's most critically ill patients

**WHAT WE NEED TO GET THERE:**
- Helipad built on top of the hospital to gain life-saving seconds for trauma patients
- Patient-centred operating theatre so the patient never has to leave for imaging or other diagnostic testing prior to surgery or other trauma care
- Expanded, state-of-the-art critical care centre offering the most advanced life-saving care, education and research
- Injury Control Centre to research and implement programs to prevent and control life-threatening injury and violence
- Virtual Post-Trauma Clinic that can help trauma survivors and their families deal with physical, emotional, cognitive and financial challenges by connecting them with support in the community
- Research in trauma rehabilitation, traumatic brain injury and critical care nursing

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// Dr. Homer Tien

to gunshot wound care. Two other physicians cared for the three patients in the emergency bays, just near the ambulance bay entrance at the hospital.

That night, Sunnybrook hospital's trauma room was in full use with staff wearing blue-grey gowns. Patients were wheeled on beds into the large and spacious trauma room, which at 1,600 square feet, is the largest trauma room in the country.

"It can get chaotic and noisy in there, so it can get tricky because you really need to be focused on the task," he said. "Sometimes it's my job to tell people to quiet down." Meanwhile, police questioned family members and recovering patients in the waiting area about the shooting.

Six patients arrived from the Danzig crime scene that night. And if the team wasn't already busy, a seventh trauma patient from a car crash in Oshawa, Ont. also came in. The Code Orange remained in effect for more than five hours.

While the trauma team worked feverishly, Critical Care Chief Dr. Brian Cuthbertson organized beds in the Intensive Care Unit and identified patients who could be moved out to accommodate the incoming gunshot patients.

"I also got on the phone with St. Michael's hospital to see how many casualties they had and what capacity they had to receive them," he said.

"There is definitely the possibility of being overwhelmed when it's a mass casualty, but everyone is trained on exactly what to do and what their roles are," Dr. Cuthbertson said.

Despite the long hours and stressful circumstances, Dr. Tien remained cool under pressure. "I never felt it was unmanageable," said Dr. Tien, who has worked as a trauma surgeon in Kandahar with the Canadian military. As a lieutenant-colonel, he has pulled shrapnel from soldiers and treated civilians who had stepped on landmines.

Both doctors credit the staff's collective efforts in the seamless treatment of patients the night of the Danzig shooting. "We have really good people, and everyone was working late and working hard to make sure it all went well," Dr. Tien said. "It was definitely a group effort that made it happen."

"It went smoother than anyone expected that night," recalls Kevin Lee, an emergency nurse who worked triage that night. He worked at the bedside of the non-critical patients who were brought into Sunnybrook.

"Not knowing how bad the situation was – that was probably the most stressful thing initially," Lee said. "But nothing went wrong and no one was overlooked."

# The Strokebusters

*Robert Kane says he is alive today because of Sunnybrook's leading research in stroke prevention, treatment and rehabilitation*

**BY ALLISON DUNFIELD**

In 2004, a clot-busting drug lessened the damage to Robert Kane's brain after he suffered a stroke. It was the second time tPA (tissue plasminogen activator) had given him a second chance at life.

The first was in June 1987 when Robert was just 37. After a major heart attack, he was given the then-experimental drug, saving his life.

Despite dieting, quitting smoking and a new interest in cycling, he suffered two more heart attacks on the August long weekend in 1996. The first hit him at work, the second in the hospital three days later. In early 1997 he received quadruple bypass surgery to remove blockages in four of his arteries.

That brings us back to January 2004, when he was hit by an intense headache at work. He was taken to Sunnybrook, where he was greeted by a stroke team neurologist and offered tPA.

"I said, 'Well, say no more,'" he laughs. "Go ahead."

The drug – which dissolves blood clots – induced blood flow back into Robert's brain, preventing more brain cells from dying. It must be given to patients intravenously within about three hours of a stroke to be most effective, and reduce the chances of serious bleeding in the brain.

"I certainly have been lucky," Robert says. "I have been in the right place at the right time, every time."

He credits Dr. Sandra Black – an internationally renowned stroke expert – and her team for his amazing recovery. His speech was only minimally affected, though he had to relearn how to move his left side and to walk. By June 2004, just months after he was stricken, he could walk again and actually cycled 50 kilometres in the Heart & Stroke Foundation's Ride for Heart. Today, the 62-year-old is back working full time as a salesman for a high-end appliance company, and still an avid cyclist. In 2011, he and one of his sons rode from Toronto to Algonquin Park – a 300-kilometre trip.

"He has had his ups and downs, but he still has a very enjoyable life. He almost died, but there are plenty of stories like that, people who do really well after stroke," Dr. Black says.

Sunnybrook can take credit for many of those amazing stories. The hospital has a long history of focusing on research, driven by the clinical needs of a high volume of stroke patients, says Dr. Rick Swartz, medical director of the North-East-GTA Regional Stroke Program and a clinician-scientist with the Brain Sciences program who specializes in strokes in young people. Spurred by Dr. Black's legacy of stroke research, Sunnybrook has a strong culture of innovation and new discoveries, Dr. Swartz adds, and stroke is one of the hospital's strategic areas of focus.

"We have plenty of patients and plenty of need so we have a connection between the bedside and the science."

He says Sunnybrook is also a research heavyweight because of its collaborative approach. The hospital has partnerships with leading brain scientists worldwide and with clinics dedicated to a variety of disciplines. In July of 2012, for example, the hospital merged with St. John's Rehab in nearby North York. The two institutions are intertwined as a single health-care organization that provides seamless care for patients, including stroke, cancer and burn victims. The merger means stroke patients will receive acute care at Sunnybrook and intensive rehab to help recovery at St. John's.

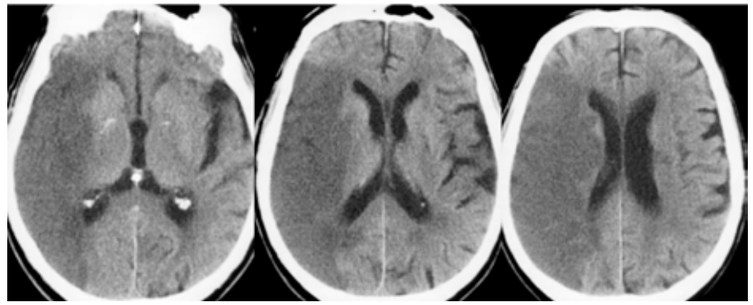
Because stroke is such a prevalent disease (about one stroke occurs every 10 minutes in Canada), there is an impetus to improve prevention and recovery rates. The disease is estimated to cost the Canadian economy $3.6-billion a year.

Sunnybrook began building its foundation for stroke innovation and care in the 1970s, Dr. Black says. It became the first Canadian hospital with a designated stroke unit, consisting of five electrocardiography-monitored beds. Many ground-breaking observational and treatment studies were conducted at that time, which helped establish the centre's recognition as a stroke leader. For example, a clinical trial showed administering stroke patients an intravenous steroid was actually harmful, leading to the practice to be abandoned worldwide.

"We had built a reputation by the mid-'70s as being the "stroke" hospital," Dr. Black says.

In the 1990s, there was a renewed interest in the importance of stroke units, with research coming from Europe showing patients in a stroke unit experienced shorter lengths of stay, reduced mortality and better outcomes in a year. Support of Sunnybrook's unit continued to grow, and last year Sunnybrook opened a new 16-bed unit providing rehab team care seven days a week. This means stroke rehabilitation can begin on Day 1, with the aim of maximizing recovery.

Sunnybrook was also one of the first in Canada to be authorized to use tPA as a treatment for patients.



*Dr. Sandra Black (opposite page) has a long legacy of pioneering stroke research.*

"With tPA, Sunnybrook's stroke research started being glamorous because we could sometimes reverse a stroke and cure people," Dr. Black says. "The tPA trials and funding by the Heart & Stroke Foundation became a catalyst for improving the system for care in the province." Sunnybrook's work on stroke was instrumental in the creation of the Ontario Stroke Network, an organization that oversees the province's regional stroke centres and strives to improve care and recovery across Ontario.

Sunnybrook's stroke scientists also began to make it possible for those living in remote communities to benefit from tPA. In the late 1990s and early 2000s, with funding from the Canadian Stroke Network, Sunnybrook and Toronto's University Health Network led the development of the innovative Ontario Telestroke service, which allows neurologists to consult with ER physicians in communities across Ontario via videocameras to assist in the delivery of tPA.

"I think Telestroke is a jewel in the crown of the Ontario Stroke System," says Dr. Black, noting the service provides tPA treatment to almost as many patients in all smaller cities combined as the bigger regional stroke centres, 50 to 70 a year.

More recently, Sunnybrook has developed a rapid response clinic aimed at their brain health, not only by control of hypertension and other vascular risks but also by including a healthy diet and exercise, which promotes healthy blood vessels in the brain and body and can help to offset the impact of stroke.

"As more people live to be an age where they are at very high risk for these dementias, they are a major challenge for our society," says Dr. Black.

Dr. Swartz is currently testing a novel tool to screen stroke clinic patients for cognitive impairment, as well as depression and obstructive sleep apnea. These conditions each affect up to 50 percent of people after stroke, are associated with worse outcomes, less recovery, higher risks of future strokes yet are frequently under-assessed.

"These are very complex brain disorders and we have a long way to go, but in the last decade alone, it's amazing the things we can do now," says Dr. Black. ◆

## IN THE SPOTLIGHT

Sunnybrook continues to make important breakthroughs in stroke research, says Dr. David Gladstone, director of Sunnybrook's Regional Stroke Prevention Clinic.

Last year, Drs. Gladstone, Richard Aviv and colleagues launched SPOTLIGHT, a multicentre clinical trial of a new image-guided treatment protocol for the deadliest form of stroke, intracerebral hemorrhage. The study aims to help patients with bleeding in the brain. Eligible patients are randomly assigned to receive the drug recombinant activated Factor VII, which has shown promise to stop bleeding.

"There currently is no proven treatment to stop bleeding in the brain. The hope is that this treatment approach, if administered quickly enough and to the right patients, will save lives and reduce disability," Dr. Gladstone says.

The trial came about based on observations during the daily workload at Sunnybrook. Neuroradiologist Dr. Aviv developed the "spot sign" method which predicts which patients are actively bleeding and at highest risk of getting worse due to the bleed expanding. Meanwhile, Drs. Black and Richard Swartz also focus on the cognitive effects of stroke and stroke recovery, increasingly relevant to Canada's aging population, about 25 per cent of whom have evidence of small, silent strokes that increase their risk of dementia.

Small vessel disease can occur in the brain's white matter causing white spots or patches to show up on an MRI scan in 95 per cent of seniors. In 20 per cent it can be severe, slowing down thought processes and causing balance problems and falls, associated with aging and scarring of the small veins deep in the brain. Research has shown the importance of making people aware of changes they can make to

## PROGRAM VISION

Collaboration is key to the future of **brain sciences**.

Our Brain Sciences Program is a big tent, and our challenge is to integrate very diverse areas under that tent. The brain can be injured in many ways – through physical injury, blood vessel damage or loss of brain function. These cause  conditions like dementia, stroke, mood and anxiety disorders, multiple sclerosis, and traumatic brain injury, to name a few.

Collaboration between different types of brain specialists is essential because diseases of the brain and mind don't exist in isolation. Brain surgeons need to understand depression better, neurologists should have a sound knowledge of psychiatric drugs and psychiatrists must be familiar with brain imaging.

Our collaborative approach is designed to combine research and patient care. This gives us real world, practical learning that we can apply quickly to other patients. By creating new knowledge and better treatment guidelines we can improve the quality of our education, and ultimately patient care. It's a model that has already served our researchers well in youth bipolar disorder, post-stroke depression and Alzheimer's disease, among many other areas.

To teach the experts of tomorrow, we are collaborating beyond Sunnybrook by developing an undergraduate neurosciences course at the University of Toronto Scarborough Campus, and a brain medicine diploma through the Royal College of Physicians and Surgeons of Canada.
Working together across disciplines and professions is the future of Brain Sciences at Sunnybrook. We can't be bound by the traditional disciplines of medicine – because the complex disorders of the brain and mind don't respect those artificial boundaries.

*Dr. Ken Shulman,*
*Chief, Brain Sciences Program*

### ACCELERATING THE PACE OF INNOVATION IN STROKE

**THE GOAL:**
Prevent, stop and heal stroke and its effects

**WHAT WE NEED TO GET THERE:**
- Facilities for research, diagnosis and treatment of mini-strokes, the precursors of life-threatening stroke
- Advanced brain imaging equipment and facilities
- Discovery of new drug therapies to help heal the brain after stroke
- Understanding how the brain reacts to electrical and magnetic stimulation to improve brain and body function post-stroke
- Research in drug delivery to the brain using nanotechnology and ultrasound

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diagnosing and treating "mini-strokes" before they become major episodes. The Dr. Thomas and Harriet Black High-Risk TIA Unit consists of a team of specialists that provides fast-track care to those who have had a transient ischemic attack and who are at imminent risk of suffering a major stroke. Patients are able to quickly receive diagnostic tests and treatment to reduce the risk of a major stroke by up to 80 per cent.

## THE EMBRACE TRIAL

Sunnybrook's stroke research made international headlines in February when a breakthrough study by Dr. David Gladstone revealed a significant portion of people who suffer unexplained strokes have silent atrial fibrillation.

This condition causes an irregular heartbeat – a major risk factor for stroke because it can cause blood clots to form in the heart which can travel to the brain. Catching this problem early could prevent many strokes, as these patients can be effectively treated with anti-clotting medications. Anti-clotting medications can cut the risk of clots and strokes by at least two-thirds.

The EMBRACE trial, conducted over three years and funded by the Canadian Stroke Network, is the world's first and largest clinical trial to study advanced heart monitoring in stroke patients. The major finding of the study, says Dr. Gladstone, is that an advanced heart monitoring strategy led to a five-fold increase in detection of silent atrial fibrillation, and resulted in almost a doubling of patients who could be treated with anticoagulant therapy. One in six patients who underwent prolonged monitoring was found to have atrial fibrillation, which otherwise would have gone undetected and untreated.

These findings are forcing experts to rethink the diagnostic and treatment approaches for such patients with so-called "cryptogenic" strokes, a medical conundrum for years. A half-million stroke patients a year may have untreated atrial fibrillation and not know it.

Dr. Gladstone presented the trial at the International Stroke Conference in Honolulu, Hawaii, and sparked worldwide attention. "This study provides the strongest evidence to date to support the use of prolonged cardiac monitoring in elderly patients with unexplained strokes or stroke warning events when the standard diagnostic tests are unrevealing."

# A young life back in tune

*A story of a daughter's bravery in overcoming addiction is music to her mother's ears*

BY DAN BIRCH

Today, Sarah Fazackerley is focused, clean and rocking out.

Music and everything about it – creating, performing and teaching it – is the 19-year-old's passion, replacing alcohol and drugs.

"Music is pretty much my new drug," says Sarah, an Oshawa, Ont. resident who plays multiple instruments and plans to become a music therapist.

As it is for so many battling addiction, Sarah's path to sobriety was a torturous one. For years, she was in and out of treatment centres and hospitals, staying sober for brief periods but always relapsing. Her life was traumatic and uncertain.

"She could have died, several times," says Sarah's mother, Fran Carnerie, a Whitby, Ont. resident. "Every time Sarah would walk out the door I would think, 'Is this the last time I'm going to see her alive?'"

Through Fran and Sarah's involvement in a Sunnybrook initiative called the Family Navigation Project, they hope other youth and families will be able to avoid the pain, frustration and trauma they experienced.

Once the pilot Family Navigation Project is established, its expert navigators – social workers, mental health nurses and others with an almost-encyclopedic knowledge of available treatment services – will fill a crucial gap in the youth mental health and addiction system by guiding families through the labyrinth of treatment options.

The navigators will become active partners in the journey to wellness. They will carefully assess the youth's needs and put them in contact with the care they need, remaining in touch to ensure the treatment is working. If it's not, they will reassess and navigate until the right care is received.

The Family Navigation Project is getting a big boost thanks to a new partnership between the Royal Bank of Canada and Sunnybrook.

This fall, the inaugural RBC Run for the Kids™ will take place in and around Sunnybrook. It's a weekend of running to help families affected by youth mental health issues and includes a five-kilometre run/walk, a 15-kilometre Kids' Challenge and a 25-kilometre run.
(See full details at rbcrunforthekids.ca)

Proceeds from this event will help make Sunnybrook's Family Navigation Project a reality.

"Addressing youth mental health is absolutely vital to the wellness of youth and their families," says Jamie Anderson, deputy chair of RBC Capital Markets and executive champion of the RBC Children's Mental Health Project. "That's why we're committed to assisting Sunnybrook on this terrific event and other programs that reduce stigma, provide early intervention and increase awareness about children's mental health issues, all designed to help children and families."

Sunnybrook's Dr. Anthony Levitt, co-chair of the Family Navigation Project, says the initiative is long overdue.

"As many as two million youth in Canada are struggling with a mental health or addictions problem, and yet only one in five will get specialized treatment, in large part because families don't know where to go," Dr. Levitt says.

"Sunnybrook deeply appreciates the efforts of Sarah and Fran, and all the other parents who have been working hard to establish the Family Navigation Project," he adds.

Fran says the project would have made a huge difference for her family. Instead of bouncing around between treatment centres ill-suited to Sarah's needs, she might have found the right program earlier.

Success was found at New Beginnings at Seven D's Ranch, a no-nonsense home operated by a husband-and-wife team in Utah. Before going there, Sarah felt she just wasn't getting the right care; she felt she had never been compelled to take a hard look in the mirror. In the full-time residential program, her behaviour was confronted and she came to understand that change was within reach.

"I needed the wake-up call, because my whole life people were just giving me the benefit of the doubt," Sarah says.

Sarah did relapse twice after her time in Utah, but it laid the groundwork for self-realization and a future of clean living. Sarah has been sober for one year.

"I've gotten to the point where nobody knows my life better than me. Nobody knows how I can deal with things better than me," she says.

Fran no longer worries that she'll lose her daughter. "My life is filled with gratitude," Fran says.

She is grateful Sarah is alive; grateful Sarah is passionate about life; grateful their future is bright.

## TAKING THE LONG VIEW

In May 2012, the Family Navigation Project held its first event, An Evening with Amy Sky. Amy, a Toronto singer-songwriter and Juno Awards nominee, gave an intimate live performance as part of an evening cocktail reception that involved discussions around mental health navigation for families and teens. Amy also addressed her own struggles with mental illness.

In October 2012, the project presented a one-time performance of *The Long Run*, an award-winning one-act play, in partnership with Toronto's Al Green Theatre. All proceeds supported the Family Navigation Project.

The play was inspired by author Rachel Ganz's own experiences with bipolar disorder, and centred around three teenaged siblings abandoned by their mother during a manic episode of her bipolar disorder. The performance was followed by a panel discussion about mental health featuring Ganz, her mother, and Sunnybrook bipolar expert Dr. Ayal Schaffer.


"Our main goal was really to raise awareness of youth mental health and educate families as to how and where to get help when they need it," says Nadine Zahlan, project manager for the Family Navigation Project. "Equally important, of course, is supporting this amazing playwright and her efforts to help us help others who are or have struggled with mental illness."

The project continued its fundraising and awareness campaign in December 2012 by hosting a lecture and question-and-answer period on parenting a child with a mental illness. The lecture featured Alyson Schafer, a well-known Toronto parenting expert and bestselling author.

*Barto Nascimento: "At Sunnybrook, it's very patient- and family-focused."*

# Moulding medical minds

*Sunnybrook's training fellowships attract some of the world's brightest young medical talent, creating a global reservoir of state-of-the-art knowledge*

**BY ALEXIS DOBRANOWSKI**

Adventure. Experience. Change. Love.

It may be the opportunity to learn from our experts that draws fellows to Sunnybrook from around the world, but there are plenty of fringe benefits once they get here.

And whatever leads them here, there are things that unite them when they leave: high-tech training from health-care's brightest minds, a love of learning, and a worldwide network of physicians filled with Sunnybrook spirit.

"Education is a global force in improving health care and we are proud of our ability to work with University of Toronto to offer medical training fellowships to doctors from around the world," says Dr. Joshua Tepper, Sunnybrook's vice-president of education.

"These doctors could choose to train anywhere, but they come to Sunnybrook because we can teach them life-saving techniques they often can't learn anywhere else. In turn, our patients, staff and students gain from having these exceptional physicians providing care and teaching during their stay."

Indeed, they leave as much here as they take home with them; they fill our floors with passion, expertise and different ways of looking at problems.

## DR. BARTO NASCIMENTO: LIFELONG LEARNER

Dr. Barto Nascimento traded in his surfboard for a snowboard when he came to Sunnybrook. Nearly a decade later, he's embarking on a new journey in Toronto and sharing the knowledge he's gained with students here and in Brazil.

A surgeon in the Brazilian beach-town of Recife, Dr. Nascimento had read about Sunnybrook's trauma centre in many journal articles, and he knew the research done at Sunnybrook was well respected. Then in 2006, he learned about the innovative bleeding research being conducted here by Dr. Sandro Rizoli. He met Dr. Rizoli and was offered a volunteer position to work with him in Toronto.

"It was challenging – there was a huge adjustment," he recalls. "The winter was hard and the language was difficult. I had studied English my whole life. But still, the language is structured differently and the acronyms are all backwards. It was very fast-paced, and I had to learn all the terminology."

And the health-care system was different than at home. "At Sunnybrook, it's very patient- and family-focused," Dr. Nascimento says. "All care decisions involve a large team – the patient, the family, the nursing staff. There's more collaboration and shared decision making."

It was a busy time: he worked with the critical care, transfusion medicine, and rapid response teams as well as trauma. He took on-call shifts. He enrolled himself in a masters of clinical epidemiology at University of Toronto. Along with the trauma and transfusion medicine research groups, Dr. Nascimento has designed a world-first study looking at blood transfusions. He's hopeful it will be published soon.

*"When I hear of fellows returning home and doing amazing things . . . I feel so proud of the enterprise of our team. These fellowships create a network of people around the world."*

Dr. Andy Smith
Chief, Odette Cancer Centre

Dr. Nascimento shares his critical thinking skills with students and other physicians at Sunnybrook and beyond. "I realized that much of the research published daily in the medical literature is far from optimal," he said. "New researchers and physicians, as well as more established ones, often lack the expertise to critically appraise other people's research. You shouldn't just trust the research and change your practice each time you read something."

So together with Dr. Rizoli, he started the "Evidence-based Telemedicine Journal Club," which meets bi-monthly via video link to discuss journal articles and teach critical appraisal of the medical literature. Several universities in Brazil participate and he's looking to expand the club to the United States, United Kingdom and Portugal this year.

For Dr. Nascimento, learning is ongoing. He recently started a new role at Sunnybrook as trauma team leader and hospitalist. Believed to be a role unique to the Trauma Program at Sunnybrook, the trauma hospitalist manages inpatients on the trauma units.

"For example, a trauma patient may first be seen by an orthopedic surgeon. But when the surgery is all done, that patient still requires care and consistency," he explains. "The hospitalist assists in the management of these patients."

Sunnybrook strives for excellence in education, patient-centred care and safety, Dr. Nascimento says. There's an opportunity to collaborate with others on many projects and conduct cutting-edge research.

"I can see my progression when I look back through these fellowships," he says. "I learned the research skills and the clinical skills."

Arriving in a new place as a fellow can be challenging, he says, because most are already established professionals in their home city.

"But there's always something new you can learn," he says. "Always."


*Dr. Patrick Roberts (right) took his new surgery skills back home to heal Jamaicans.*

### DR. PATRICK ROBERTS: JAMAICA'S FIRST AND ONLY SURGICAL ONCOLOGIST

Jamaica's Dr. Patrick Roberts admits he didn't choose to come to Toronto the first time – but he did choose to come back after that first trip.

Dr. Roberts was offered an opportunity to travel to Toronto for a six-month elective in 2008.

"Being a free-spirited child, I accepted," Dr. Roberts laughs. "I don't know why: I had no relatives there, I didn't know anyone. I had just my credit card in my pocket. But I filled in the paperwork and I was on my way."

He says – perhaps too modestly – his placement at a downtown Toronto hospital wasn't easy at first.

"I didn't know even where the hospital was. I was thrown in and I had to swim," he says. "This wasn't a walk-on-the-water, got-here-and-started-to-take-charge kind of story. It was so different: the health-care system is different. There were electronic patient records. The hospital was doing numerous transplants and procedures I hadn't even seen before."

By the end of his six-month stay, Dr. Roberts received the University of Toronto's Paddy Lewis Teaching Award for excellence in teaching by a senior resident, and the Sopman Humanitarian Award for patient care.

He learned a lot on that first trip to Toronto, developed a keen interest in liver surgery – and fell in love with Jamaican-born Canadian nurse Morissa McCreavy. He returned for a two-year Sunnybrook fellowship in 2009.

He spent the bulk of this time working with Odette Cancer Centre chief Dr. Andy Smith, head of surgical oncology, Dr. Calvin Law, Dr. Sherif Hana and Dr. Natalie Coburn in the surgical oncology program.

"Of course, I learned technical skills, but I also learned independent thinking, troubleshooting, problem solving," Dr. Roberts says. "They were all excellent teachers. They taught me to be a better diplomat. They taught me what to say and how to say it."

Dr. Roberts returned to Jamaica in 2011 and became (and remains) the first and only surgical oncologist in that country, and one of just two in the Caribbean. He's introduced numerous surgical procedures never seen before on the islands; last year he performed the first laparoscopic liver resection in the Caribbean and he's also introduced radiofrequency ablation of the liver and kidney, and other minimally invasive procedures.

"A lot of these procedures wouldn't otherwise be possible in Jamaica," he says. "The standard of care we are now able to provide has been taken to the next notch. The impact of this fellowship on Jamaica and the Caribbean has been huge."

Dr. Roberts and Morissa are now married. Once she completes a master's degree in nursing this summer, she will join him in Jamaica. Before then, he will welcome a visit from Dr. Smith – arguably one of his biggest fans.

"Dr. Roberts: what a delightful guy," Dr. Smith says. "Patrick is a big spirit with a warm, sunny personality. He embodies the term 'fellowship.' He lights up a room.

"When I hear of fellows returning home and doing amazing things – and I could tell you a story like Patrick's for each of our fellows whose photos line the hall in the Odette Cancer Centre – I feel so proud of the enterprise of our team," Dr. Smith says. "We can feel so proud of what we do here. It's a cliché to say it, but the world is small. It really is. These fellowships create a network of people around the world."

The global impact of the fellowship program is significant, Dr. Roberts says.

"There is so much academic exchange. We frequently call each other for advice, send images and go over them together. And I do the same with my contacts in Australia."

Dr. Smith says fellowships provide for a "bi-directional transfer of knowledge."

"I think we get to take away as much as we give," he says. "For example, I do a little technique now in one of my procedures that a fellow from Dalhousie University taught me."

Dr. Smith will give a guest lecture at the University of the West Indies in Kingston, Jamaica, during his visit, where Dr. Roberts now maintains a full-time teaching post.

"Teaching really is my passion," Dr. Roberts says. "I have students, residents and other staff participating and getting introduced to and interested in these procedures, and hopefully soon we will have more surgical oncologists here through our own training."



## PROGRAM VISION

At Sunnybrook, we treat more people with their lives on the line than any other hospital in Ontario. That life-saving skill and knowledge, offered nowhere else in the world, is passed on through the living classroom that is Sunnybrook.

The future of **education** at Sunnybrook will build on the unique educational experience we offer. We will build a state-of-the-art education facility, where we will break down the barriers between specialties in health-care education and create effective inter-professional teams.

Our education researchers are developing, adopting and sharing new ways of delivering health-care education. In our Canadian Simulation Centre – the country's first – we create real-life situations to teach technical skills, communication and teamwork. We are developing new simulation-based curriculum and a minimally invasive surgical skills centre, where the experts of the future can hone their skills in the safest way possible.

And, we will continue to provide educational support to our 10,000 employees, physicians and volunteers through professional development opportunities and leadership training. Health-care knowledge changes at such a rapid pace, and we must be nimble to adapt in real-time and demonstrate our commitment to life-long learning.

At Sunnybrook, we are all teachers and learners. Education matters.

*Dr. Joshua Tepper,*
*Vice-president, Education*

### ACCELERATING THE PACE OF INNOVATION IN EDUCATION

**THE GOAL:**
Teach the world our life-saving innovations

**WHAT WE NEED TO GET THERE:**
- State-of-the-art facility and technology in which to teach the next generation of medical minds
- Point-of-care classroom facilities
- Advanced simulation equipment
- Minimally invasive surgery simulation centre
- Continuing education scholarships
- Research in the most effective ways to teach and to learn

**HOW YOU CAN HELP:**
Invest in these and other innovations at **sunnybrook.ca/HealNow**

PHOTOGRAPH GALIT RODAN

*Laura Dundas has seen her son Adam flourish through Sunnybrook's "kangaroo care" approach.*

# 'It's not just about keeping babies alive – it's about giving them the best possible future'

*Even as Sunnybrook's NICU staff are helping premature babies win the fight to survive, they take care to nurture their early relationships with the parents*

**BY MICHAEL McKINNON**

Laura Dundas was worried her son – born dangerously premature at just 25 weeks – was not going to do well. She felt disconnected from Adam; he seemed almost untouchable where he rested in his incubator.

All that changed on his third day when a nurse in Sunnybrook's Newton Glassman Charitable Foundation Neonatal Intensive Care Unit (NICU) offered to help Laura "kangaroo" her son. She held him skin-to-skin against her chest and her fears melted away.

"It was a really sensational experience," she recalls. "It felt so calm and so natural; he curled up into me when he was placed on my chest, and it was a really lovely, fantastic moment."

It's actually much more than a wonderful moment; kangaroo care – that warm, loving connection a parent and baby make when they're skin-to-skin – has very real, clinical benefits for both. It's especially important for premature infants in the NICU, already at risk for serious developmental issues. Research suggests kangaroo care helps stabilize the baby's heart rate and oxygen absorption and decrease the risk of infection. The connection reduces baby's stress and aids brain development at a critical time.

It's good for the mother, too, decreasing her stress and boosting her ability to produce breast milk.

"Mom holding her baby just hits those hormones responsible for making milk," says Luisa King, an NICU Breastfeeding Resource Nurse. "So many moms report that they struggle with artificial pumping until they connect with their baby. Then it's not a big deal anymore – that simple act of skin-to-skin contact spurs that whole process on." It boosts parents' confidence, too, because baby is no longer seen as a fragile china doll.

"And NICU dads are at a real risk for depression," adds Kate Robson, Sunnybrook's NICU parent coordinator. "Holding their babies is one of the things that can really help them."

Kangaroo care fits perfectly into Sunnybrook's family-centred approach to caring for its tiniest patients, who sometimes stay in the NICU for months. The NICU team – including Kate and Luisa – recently held Closer to the Heart, a weeks-long celebration of parental touch. Launched on Valentine's Day, the campaign kicked off with a party for staff and families and featured education sessions and events to raise awareness of the value of skin-to-skin contact. The campaign was beyond successful, Kate says, with some 600 hours of skin-to-skin contact logged in just two weeks.

"In an environment based on patient-centred care, anything that puts the baby and family at the centre is a good thing," explains Kate. "And so we wanted parents to be comfortable asking about kangaroo care, and requesting it. We wanted nurses to feel more comfortable offering it, and for everyone to really understand why it's so important."

Perhaps surprisingly, it takes a state-of-the-art NICU like Sunnybrook's to facilitate this kind of back-to-basics care. Although the unit is equipped with the latest high-tech equipment and systems, the team's focus is on minimizing interventions whenever possible and promoting parental contact.

Here, technology exists to keep care natural. Sunnybrook's NICU, the only one in Canada that consists entirely of single-patient rooms, allows parents the privacy needed for longer kangaroo care sessions with their babies. In-room sound-proofing and muted lighting throughout the NICU offers the right environment for brain development, and reduces the mental fatigue brought on by louder, more chaotic NICUs.

Parents are welcome around the clock, and private entrances with key card access means they never have to ask to enter. Incubators are positioned so parents always have free access to their baby on one side even if a nurse is in the midst of care on the other.

With breast milk for each patient a top priority, each mom has free access to pumps at home and in-hospital as long as their baby is in the NICU. Mother's milk is then prepared on-site by a team nurse King lovingly calls the "Dairy Queen."

"When we had the opportunity to design this unit, our approach was very deliberate in creating a setting where the environment would be more appropriate for premature patients," says Dr. Michael Dunn, staff neonatologist, whose input helped steer the design of Sunnybrook's NICU, which opened in September 2010.

"There's been a very big shift in neonatology to try to interfere less and facilitate natural development as much as possible. This facility allows that to take place much more effectively."

"Our technology is a tool that we have to enhance what the baby is created to do, which is to bond with the parent," says Ms. King. "When it comes right down to it, babies grow and thrive when they're with their moms or dads. All our technology is focused on putting these babies back to where they belong – with parents – and the impact that has on their families is immense."

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Even years later, Sunnybrook has a special place in the hearts of NICU 'graduates' and their parents. Much of that is due to the fact care doesn't stop when infants are discharged; patients are followed through Sunnybrook's NICU Follow-Up program for as long as six years.

Sunnybrook's NICU experts assess infants' physical, motor and cognitive development, making referrals to community services and specialized professional consultation when needed. Parents are made part of the health-care team early on, learning to manage the stresses of the NICU and focus on their babies.

And Sunnybrook's follow-up clinic is like no other in Ontario, treating patients up to six years old where others stop at two. Here, former NICU parents talk about what Sunnybrook meant to them.

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MAGGIE

Maggie weighed just one pound when she was born 15 weeks premature. Barely larger than a block of butter, she fit into the palm of her dad's hand.

It was a stressful start to life, to be sure. An emergency C-section at just 25 weeks had saved Maggie's life after she stopped growing in the womb, but landed her in a potential minefield of complications. Maggie had one thing going for her: Sunnybrook's NICU was her home for the first four months of her life.

"I think about it every day, and I'm grateful for Sunnybrook every day," says Kate, Maggie's mom. "Maggie is wonderful, and she wouldn't be if Sunnybrook hadn't been there."

Kate is now Sunnybrook's NICU parent coordinator, a role that sees her sharing the knowledge she learned first-hand as a NICU mom with parents experiencing the same challenges today.

## MOM AND BABY BOTH DOING FINE

When Natalie arrived at Sunnybrook just 36 weeks into her pregnancy, her bacterial meningitis was severe. Her high fever wouldn't subside, and she suffered from nausea, headaches and a sore throat. She was immediately intubated and induced into a coma. When she woke from that coma a few days later, her beautiful baby boy Carmine had been born via emergency C-section and was thriving.

"I saw the nurse's smile and knew everything was going to be OK," recalls Natalie. But while Natalie and her baby were being cared for separately, they connected early thanks to Sunnybrook's focus on keeping mothers and with their babies. In fact, Natalie was able to initiate breast feeding while still in the ICU, and baby Carmine was treated with preventive antibiotics in the NICU.

"They put him to the breast right away," recalls Natalie. "I wanted to initiate breast feeding as soon as possible and that was as soon as possible – literally."

That extra effort to make sure mothers and their babies experience the full benefit of being together is an important part of the Sunnybrook approach, explains Sue Hermann, an advanced practice nurse in the Maternal & Newborn and Breastfeeding department.

"That's just the type of care we do," she says, adding that Sunnybrook's Sick Mom, Healthy Baby Program works to keep mothers with their babies together, even when the mother is being cared for in other areas of the hospital or when the baby is discharged first.

Now more than a year old, Carmine climbs the stairs and points to the CD player when he wants to hear music (he likes Katy Perry and Elmo's *Hot & Cold*), and his belly laugh is cute and contagious, Natalie says.

Healthy mom, healthy baby.

## PROGRAM VISION

We are providing the best care for the province's tiniest patients and women with high-risk pregnancies.

Our expertise in ultrasound early in pregnancy is giving women the answers they need. We have a strong focus on caring for pregnant women with diabetes, renal disease and hypertension, and we care for pregnant women needing critical care through our helipad and trauma centre.

Over the next few years, we'll continue to expand our **Women & Babies Program**. We'll develop an outreach program that will see women receive care in their community hospital, for example, working with their own obstetrician.

We will attract experts to a number of roles in maternal fetal medicine, developmental pediatrics and imaging. The research performed by these experts will result in better treatments for women and infants everywhere.

We will continue to improve the way we combine technology with family-centred care. In other words, technology will continue to compliment family-centred care – not replace it.

Our reach will extend far beyond Sunnybrook's walls, because the tiniest patients count us.

*Dr. Arthur Zaltz, Chief, Obstetrics and Gynecology*

*Dr. Eugene Ng, Clinical Director, NICU; Acting Chief, Department of Newborn & Developmental Pediatrics; Aubrey & Marla Dan Program for High Risk Mothers and Babies*

*Jo Watson, PhD, Operations Director, Women & Babies Program*

### ACCELERATING THE PACE OF INNOVATION IN CRITICALLY ILL BABIES AND MOTHERS WITH HIGH-RISK PREGNANCIES

**THE GOAL:**
Improving the outcomes for Ontario's smallest babies and their mothers

**WHAT WE NEED TO GET THERE:**

- State-of-the-art equipment and facilities that support the most complex critical care available in the country
- Bridge program that establishes links between preterm children and their families to the medical, community and education sectors in order to ensure life success well beyond their initial stay into middle childhood
- Clinic trails designed to uncover the best care before, during and after pregnancy for both mothers and babies
- Imaging equipment designed specifically for critically ill preterm babies so these fragile babies don't have to leave the neonatal intensive care unit

**HOW YOU CAN HELP:**
Invest in these and other innovations at **sunnybrook.ca/HealNow**

Change the outcome.
Heal the future.
Sunnybrook

"Sunnybrook is very good at developmental care," says Kate. "It's not just about keeping babies alive; it's about giving them the best possible future."

Six years later, Maggie's biggest concerns are whether to take ballet or breakdancing, and where she should focus her career within the arts. You know, kids' stuff.

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Thomas has come a long way since March 2000.

Born after an emergency C-section at 24 weeks, Thomas weighed less than two pounds and suffered from frequent lung infections. He spent the next four-and-a-half months in the neonatal intensive care unit, struggling to adapt to new ventilation techniques.

Today, he has dreams of being a professional snowboarder, can pitch a baseball at 77 km/h and plays the bagpipes.

"He's been playing four years and loves it – and it's not an easy instrument to play," says Joanne, his mother. "He's also a strong swimmer and plays hockey – all these lung-dependent activities – and he has absolutely no problems with them."

Much of that success is no doubt due to Sunnybrook's extensive NICU Follow-Up Clinic. With a follow-up rate of 85 per cent and seeing up to 200 babies and children a month, the clinic is designed to ensure preemies – many of whom develop physical, behavioural and learning disabilities – receive the best start in life.


THOMAS

"We are the standard of excellence. We spend years with our families and share their ups and downs," says Dr. Paige Church, director of the clinic and one of only two pediatricians in North America – and the only one in Canada – with a combined fellowship in neonatal-perinatal medicine and developmental behavioural pediatrics.

"Not a day goes by that we don't think about where he started," says Joanne. "Sunnybrook was our lifeline as much as his. The compassion they had was incredible and they were there for us every step of the way. For us, to have them as an extended family was key."

*The family of Joseph Clark (centre) at the Dorothy Macham Home.*

# A safe house

*After a distinguished military and professional life, Joseph Clark needed a sanctuary that could deal patiently with his dementia. He found it at Sunnybrook*

**BY JANE LANGILLE**

Last November, the retirement home where Joseph Clark lived with his wife, Patricia, was no longer the right fit for him. He was losing his ability to verbally communicate with staff and his friends, leaving him feeling increasingly isolated, despondent and angry. Reluctantly, Joseph's family – including daughter Carolyn Rabbior and sons Joseph and Tom – agreed with staff that alternate accommodations were needed urgently.

The family found those accommodations in Sunnybrook's Dorothy Macham Home, the first and only facility in Canada designed to meet the needs of a special group of war veterans who display aggressive or disruptive behaviours due to dementia. The home opened in 2001 with funding from Veterans Affairs Canada. The 10-bed facility is usually full with a short waiting list.

Joseph volunteered at the age of 18 with the Royal Canadian Navy and served for five years as a gunnery officer on the HMCS Loch Achanalt and the HMCS Arrowhead in the Second World War. Now 91, he suffers from vascular dementia and has aphasia, damage in the area of the brain responsible for language, so he can no longer speak and writes only a few words.

"This is very frustrating for a man who built a career in communications," says daughter Carolyn. "He founded Canada Newswire and served as president and chief executive officer there until he retired. He started the Ontario Nurses'

Association. Two years ago he was still writing family memoirs and stories about his ships."

The Dorothy Macham Home is modelled after Tasmania's Adards Nursing Home (Adards is an acronym for Alzheimer's disease and related disorders), an internationally renowned facility pioneered by psychiatrist Dr. John Tooth. He advocated that dementia patients with difficult behaviour could benefit from specially designed facilities to address their needs, rather than placing them in psychiatric hospitals.

"As disruptive and aggressive behaviours are either a normal or an exaggerated response to an unmet need, our job is to find the unmet need and meet it," says Dr. Jocelyn Charles, medical director of the Veterans Centre at Sunnybrook.

The Dorothy Macham Home looks and feels like a regular home, making it easier for residents to navigate their way around it. Natural light streams in through skylights over wide hallways where two people using wheelchairs or walkers can pass with ample space. Residents can stroll whenever they like on the interior walking path, separate from the bedroom areas.

A large fireplace graces the common living room where two doors lead to a beautifully landscaped outdoor garden where residents can wander freely. Fences are disguised by strategic landscaping to minimize any feelings of confinement. All locked doors inside the home are disguised and there is an unlocked door nearby which residents can use.

Each private bedroom has large windows with a garden view. Bedroom floors have sensors so staff can be alerted if someone is out of bed. In the bathroom, the light turns on automatically, the toilet is visible from the bed, and mirrors can be hidden if residents find it distressing to see their own reflection.

The interdisciplinary staff works with family members to design a care plan to help each resident achieve his or her best life experience. "What we realized from the very beginning was that it takes a very special person to work here," says Dr. Charles. "The right fit is based more on a person's values and attitude rather than just their training: it's how they approach people with dementia." The staff includes registered nurses, registered practical nurses, a patient care manager and patient service partners, an attending physician, a consulting psychiatrist, a pharmacist, and recreation and music therapists. The consulting team includes physiotherapy, occupational therapy, speech therapy, audiology, social work, and spiritual care.

"I try to assess the family dynamics and the veteran's situation before they arrive," says Sylvia Buchanan, patient care manager. "Once we had a veteran who refused to wear anything except white boxer shorts. The family was embarrassed about admitting him through the front door, so we simply arranged for him to be received at the side door entrance."

Individual care means there are no fixed schedules for eating or sleeping. "Once we had a retired policeman who had always worked nights. We didn't try to change that. He had all his meals at night and slept all day," says Dr. Charles. "Research shows that the smell of cooking increases appetite and calms behaviour, so we have a coffee maker, a bread maker and often bake cookies. If residents say they're hungry, we just ask what they would like, even if they've just eaten."

Consultation with family members is a continuing process. Residents stay at the home as long as necessary to diminish aggressive behaviours: the length of stay varies from two weeks to four years.

"When we evaluated the home after the first year of opening, we found that we reduced aggressive incidents by 55 per cent and staff incidents across all our cognitive units by 30 per cent because we moved the most aggressive residents to the Dorothy Macham Home," says Dr. Charles.

Joseph's family is relieved he is living peacefully. "We have seen a big difference. The whole place exudes calm and his behaviours have been smoothed out," says Carolyn.

"The staff is patient with his language difficulties and they discovered very quickly that he doesn't like loud noises. He is in the best place he could be. They just truly know who he is as a person," Carolyn says.

"He is treated with respect here," adds Patricia, Joseph's wife. "They have staff meetings once a week and a couple of times Joe turned up to join the meeting and they let him. I think that's wonderful."

*Joseph Clark's wife Patricia says "he is treated with respect here."*

## ***Dorothy Macham:*** *the person behind the name*

Dorothy Macham was an accomplished nurse from Toronto who made significant contributions as a health care leader during World War II and in civilian life after the war. The naming of the Dorothy Macham Home celebrates her outstanding service and career.

Dorothy enlisted with the Royal Canadian Army Medical Corps in 1939 and served for five years. She spent most of her duty in the operating rooms of surgical units near the front and was stationed at various times in England, Italy, Holland, Belgium and France.

Of the nearly 4,500 Canadian Nursing Sisters who served in the war, Dorothy was one of the few women to attain the rank of major. In recognition of her accomplishments, King George VI presented her with the Royal Red Cross Medal in July 1945.

When she returned to Canada, Dorothy was appointed superintendent of Women's College Hospital and after 29 years of service, she retired in 1975. Four months later, she accepted the position of executive director at West Park Hospital where she worked until 1980.

The Nursing Sisters Association of Canada recommended Dorothy's name for the home, in recognition of her many contributions to health care. At 92, Dorothy attended the grand opening.

# RESEARCH & INNOVATION

*the latest in leading-edge developments at Sunnybrook*

## THE BEST WAY TO BIRTH TWINS

**An international study led by Sunnybrook researchers has found vaginal birth is just as safe as C-section when it comes to twins. The result could reverse birthing trends around the world.**

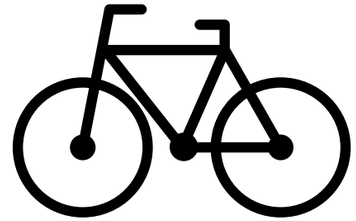
**"The perception is that C-section may be safer for the baby, but our Twin Birth Study has proved this is not true. The evidence is clear that C-section for twins is not the best plan," says Dr. Jon Barrett, chief of Sunnybrook's Maternal Fetal Medicine and the study's lead investigator. "Women expecting twins should be encouraged to plan for a vaginal birth, provided that an obstetrician, experienced in twin vaginal births, will be available at delivery."**

**The debate about the best method of delivering twins has been controversial, with planned C-section gaining support in recent years. However, the Twin Birth Study – after nine years of research – found no significant difference in outcome between natural birth and C-section.**

**Twins have a significantly higher risk of complications around the time of labour than single babies, and the number of twin births has increased by at least 40 per cent over the last decade due to in vitro fertilization, Dr. Barrett says. "We hope the results from our study will change dramatically the way twins are delivered worldwide. It will hopefully reverse the trend and prompt the need for more training for vaginal births."**



## CYCLING FOR A HEALTHIER MIND



Doctors could soon be prescribing bike rides to bipolar disorder patients.

That's because early findings from a Sunnybrook study suggest aerobic exercise benefits cognitive function, which could lead to important therapy for these patients.

Dr. Benjamin Goldstein, director of Sunnybrook's Centre for Youth Bipolar Disorder, says exercise has the potential to become an important part of treatment for bipolar patients. He cites a growing body of research which demonstrates exercise helps improve mood and brain function.

Dr. Goldstein is teaming up with Dr. Brad MacIntosh, an expert in brain imaging in Sunnybrook's Heart & Stroke Foundation Centre for Stroke Recovery. So far, 15 teenagers with bipolar disorder have participated in the full-day study, which sandwiches a 30-minute bout of stationary cycling between two sessions in an MRI scanner. During the scanning sessions, participants complete a test of attention span, and MRI images are collected to determine how the brain is functioning. It appears activity in specific brain regions is reduced following exercise. Drs. Goldstein and MacIntosh believe aerobic exercise may lead to greater brain efficiency, allowing the teens to maintain their accuracy on the test with less brain effort.

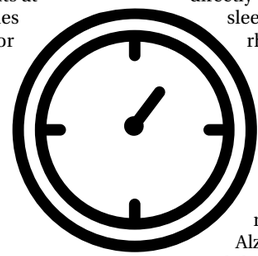
"The more biological evidence we have that exercise does positive things for the brain and the body in these situations would make suggestions to exercise come across as more serious," says Dr. Goldstein.

He says a simultaneous focus on brain and body is key to better understanding bipolar disorder and identifying new treatment strategies.

## THE RIGHT TIMING FOR STAYING ALIVE

Imagine knowing what time of day you're most likely to die. It sounds creepy, but the information might actually help keep the Grim Reaper at bay.

"If we know when a person is likeliest to die, we can act to prevent this by administering medical treatments at more optimal times and better monitor vulnerable patient populations," says Dr. Andrew Lim, a Sunnybrook neurologist and lead author of a recent study that discovered a gene associated with one's likeliest time of death, as well as with the timing of one's sleep-wake cycle.



Researchers measured sleep/wake and activity rhythms in older individuals and obtained their DNA. They looked for common gene variants that might play a role in the internal biological clock. "This is exciting because it is the first gene variant shown to influence the timing of directly-recorded human sleep and activity rhythms, as well as time of death," Dr. Lim says.

The findings came from research that set out 15 years ago to investigate risk factors for Alzheimer's disease. While Dr. Lim and fellow investigators were able to identify a broader period for time of death – for instance, late morning – they were not able to predict an exact time.

*"If we know when a person is likeliest to die, we can act to prevent this by administering medical treatments at more optimal times"*

Dr. Andrew Lim
Sunnybrook neurologist and researcher

# Sunnybrook by the numbers

*Through our website, we asked what you've always wanted to know but were afraid to ask – and you weren't shy to respond. Here are just a few of the questions for which curious minds wanted the answers*

## DOES SUNNYBROOK REALLY HAVE THE LONGEST HALLWAY IN CANADA?

That's a tough one to answer; you may be surprised how many places claim to have the longest hallway. What we do know is that one of our corridors is about 500 metres long – half a kilometre, or close to five football fields end to end. And if you find yourself at one end needing to get to the other, we're sure this half a kilometre will feel like the longest in the world!

## HOW MANY TOILETS ARE THERE AT SUNNYBROOK?

Great question – and one that could only have been asked by a nine-year-old. (It was!) Sunnybrook boasts 1,264 washrooms at its Bayview campus alone, and some of those washrooms house as many as five toilets. Suffice it to say if nature calls, Sunnybrook will be there to answer.

## HOW MUCH GARBAGE DOES SUNNYBROOK PRODUCE IN A YEAR?

The hospital generates 4,672 metric tonnes of general, recycling and biomedical waste per year. That's divided between 1.2 million patient visits a year and close to 10,000 employees – plus 2,500 medical students. In fact, Sunnybrook has a strong reputation for its green initiatives. It has been named one of Canada's Greenest Employers four years in a row, and won the 2012 Green Toronto Award in the Green Business category. For Sunnybrook, it seems, it's quite easy being green.

## HOW MANY DIFFERENT MEALS DO YOU SERVE IN ONE DAY?

Sunnybrook's Food Services Division prepares and delivers more than 3,000 meals per day. That's more than a million meals a year, including nearly 700,000 cups of coffee and tea and more than 68,000 servings of Jell-O a year. (And that doesn't include meals served in our various cafeterias to staff and visitors).

## HOW MANY PATIENTS DOES SUNNYBROOK SEE?

Sunnybrook has a whopping 1.2 million patient visits a year. That includes 18,634 mammographies, 46,840 CT exams, 36,364 ultrasounds and 219,478 MRI scans. With those kinds of numbers, it's not surprising Sunnybrook is the largest single-site hospital in Canada.