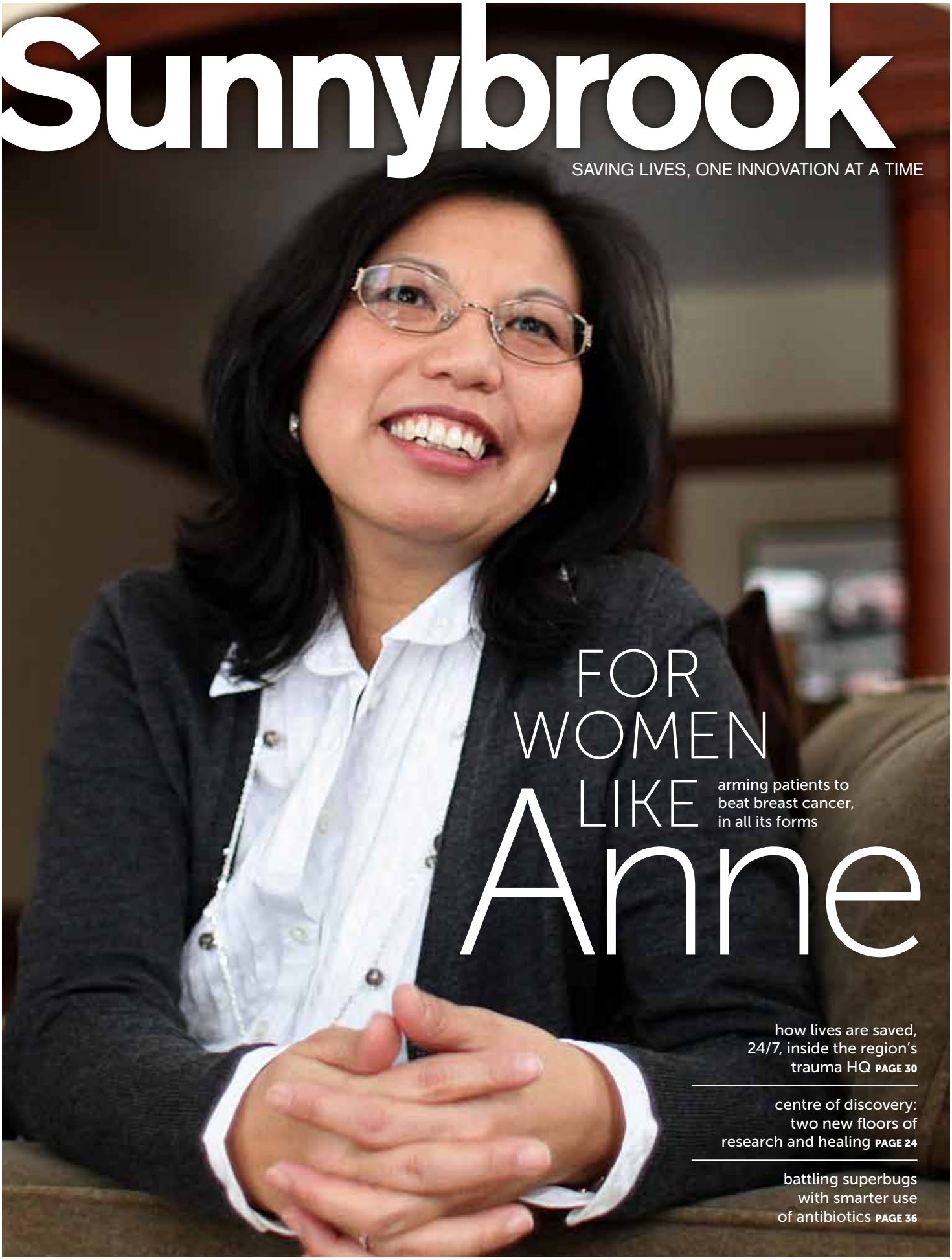
Sunnybrook

SAVING LIVES, ONE INNOVATION AT A TIME



FOR WOMEN LIKE Anne

arming patients to beat breast cancer, in all its forms

how lives are saved, 24/7, inside the region's trauma HQ PAGE 30

centre of discovery: two new floors of research and healing PAGE 24

battling superbugs with smarter use of antibiotics PAGE 36

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YOU ARE HELPING US CHANGE LIVES

Sunnybrook magazine is your portal into the daily life of Sunnybrook. We want to keep you up to speed on what Sunnybrook is doing to ensure you have access to the best care possible. And, we want to show you how investments made in Sunnybrook are having a real impact on the lives of real people.

Since our last issue, I've heard from readers in a number of ways.

Our stories stuck with some of you, so much so that hundreds made donations to important projects we told you about. For this we're so grateful. I also received many letters telling me how important Sunnybrook magazine is to our community.

Here's what some of you told me:

"Wanted to let you know that I thoroughly enjoyed reading your magazine. It was filled with exciting news and I read it from cover to cover." – Bonnie P.

"I just received my first issue of Sunnybrook Magazine. I think it's a fantastic idea." – Jessica V.

"I read the magazine from cover to cover and I learned more about Sunnybrook than I ever knew before." – Richard P.

In this issue, we share with you important stories on topics that we help our patients deal with each and every day – breast cancer, managing end-of-life issues and life-threatening trauma. You'll also read about the latest in research and innovative new treatments. And don't miss the centre spread where you'll get a peek at the truly amazing work that will go on in the new research space we're building at Sunnybrook.

As always, we thank our corporate supporters who make this publication possible, ensuring that no hospital operating funds are used to bring you these important stories.

Once you've read through this issue of Sunnybrook Magazine, please let me know what you'd like to hear more about. As a part of Sunnybrook's community, this is your magazine.

Just e-mail me at jennifer@sunnybrook.ca.

Jennifer Tory
Chair,
Campaign for Sunnybrook

Sunnybrook

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WE ARE SUNNYBROOK

THE PHARMACOLOGIST

Interaction Man

For over a decade, Dr. David Juurlink has been Sunnybrook's master in demystifying dangerous drug mixes.

While the New Glasgow, N.S., native works with patients, and as a clinician, researcher, teacher and administrator, some of his most vital work involves analyzing large-scale patient data to uncover dangerous drug interactions.

"[We] study disease on a large scale, a large number of patients, as opposed to patients one by one, using their health-care records," says Dr. Juurlink, head of the division of clinical pharmacology and toxicology.

His work aims to ensure what a doctor prescribes is truly what a patient gets, and that drugs are safe to take.

A graduate of Dalhousie University and with a PhD from University of Toronto, Dr Juurlink's research in the field of drug safety is supported by a New Investigator Award from the Canadian Institutes for Health Research. He also studies adverse drug events, the epidemiology of drug interactions, and the epidemiology of suicide.

Dr. Juurlink has played a critical role in key findings, including that some heartburn medications can raise the chance of a repeat heart attack, that some blood pressure sufferers taking calcium channel blockers could experience critical blood pressure drops while on certain antibiotics, and that the antidepressant Paxil may interfere with the breast cancer drug tamoxifen.

"When a new drug is on the market, in some ways it is a bit of an experiment on the population, and we use data available to use to see if it's a safe or unsafe thing," the physician explains. "Once on the market, the side-effects of drugs become more apparent because so many people are taking them.

"My colleagues and I ... try to give patients and clinicians insights into the safety of drugs in the real world." He adds: "Drug safety is something that has always been important but it's especially important nowadays. It is a natural intersection of pharmacology and epidemiology, but it's not a really big specialty – not a lot of people focus on drug safety, so there are a lot of important contributions to be made." •

THE NURSE

The veteran's best friend

Registered practical nurse Monalisa Page starts every shift at the Sunnybrook Veterans Centre asking herself: "How do I treat my veterans better?"

Since May 2007, Ms. Page, also a medical technician in the army reserves, has been spreading joy to the war veterans who become residents at the centre when they can no longer live at home independently.

Ms. Page is a member of an interprofessional care team of nurses, physicians, occupational and physiotherapists, pharmacists, audiologists, speech-language pathologists, social workers, chaplains, dietitians, creative arts and recreation therapists.

The average age of residents of the largest veterans- care facility in Canada is 88, and to Ms. Page, being on the job is like being at home. "I enjoy it because I was raised by my grandparents, and I still live with my grandmother," says Ms. Page, who was born in Spain and raised in the Philippines before her family moved to Stouffville, Ont., in 1989.

She didn't start out with the goal of becoming an RPN. While in the social sciences program at McMaster University, she realized it wasn't her career path, so she joined the military and then got the urge to try out nursing. She joined the Sunnybrook Veterans Centre after earning her RPN credentials at George Brown College.

Ms. Page, whose husband, Capt. Jason Page, is an artillery officer in the Canadian Forces, has many stories about how veterans have touched her heart, but befriending one particular resident stands out. The hearing-impaired man in his late eighties normally kept to himself, but about three years ago Ms. Page walked into his room, tapped him on the knee and said, "I just wanted to say hello."

"Something as simple as making an effort to say 'hello' is so important," she says; after her initial exchange with that veteran, he opened up, and their friendship continues today.

This summer, Ms. Page will become RPN co-lead for cognitive support for the annual June Camp trip to the Lake Joseph Centre in Muskoka that is a highlight for many veterans at the centre. Her goal within the military is to become a nursing officer (RN), but she hopes to continue at Sunnybrook in some capacity. •

THE PHYSICIAN ASSISTANTS

New kids on the block

Zlata Janicijevic and Maureen Taylor's idea of success on the job is to get patients fixed up and back home as efficiently as possible.

Ms. Janicijevic, Ms. Taylor and other physician assistants – newcomers to the health care scene in Canada – are trained to support doctors in ERs. They conduct patient interviews, take medical histories and perform exams and procedures - from suturing cuts to setting broken bones, sedating patients, and advising on preventive health care.

Ms. Janicijevic was the first PA hired at Sunnybrook, in September 2009, and oversees three other PAs, all from the first graduating class produced by McMaster University – including Ms. Taylor, the oldest of the 21 graduates.

They are among 140 certified PAs in Canada, most trained in the military, and some 70,000 in the U.S., where they've been part of the health care system for six decades. The Ontario government says PAs have helped boost quality of care and reduce hospital and ER wait times, which is especially important at Sunnybrook – Canada's largest trauma centre.

"It's never a wonderful thing to be in the emergency department, so if I can make that experience for patients better, easier, less time consuming that's a good thing," says Ms. Janicijevic, who on a typical shift may handle up to a dozen patients. "It really shows the initiative and innovation at Sunnybrook as a whole, the fact it is willing to take on this new profession."

Ms. Taylor, who spent some two decades as a health journalist with CBC-TV's The National and five years producing a weekly health show for TVOntario, was looking for a new challenge. At age 48, with her two children grown and the support of her husband, infectious disease specialist Dr. Donald Low of Mount Sinai Hospital, she turned in her microphone for medical books. Admittedly slightly intimidated that the other McMaster PA applicants were younger and fresh from earning their undergraduate degrees, she dove into the course and joined Sunnybrook last fall – using the communication skills honed as a journalist.

"It's a great role because you're challenged to listen to the patient's story, do a physical exam, come up with a differential diagnosis, order the tests that need to be done and go to the physician and see if I'm on the right track," she says. •

THE FUNDRAISER

Jumping for a cause

Derek Walton, ALS patient and Sunnybrook donor, has been jumping out of planes for a cure for ALS. Amyotrophic lateral sclerosis (also known as Lou Gehrig's disease) is a fatal neurodegenerative disease that Derek says ultimately "buries you alive."

Derek founded Jump for "PALS" (People with ALS), an event that he has held twice, most recently this past August, to benefit the ALS program at Sunnybrook, the largest of its kind in North America. Through these events, Derek, along with dozens of other skydivers, has raised over $150,000 by jumping out of planes at 12,500 feet.

"In order to have a life of purpose, you need to have a purpose in life," he says. "I am living with ALS. I am not dying of ALS. After all, life itself is terminal. I want to leave a legacy behind with Jumping for 'PALS', and would like this event to continue every year after I am gone."

He adds, "We don't have a Michael J. Fox for this disease because we don't live long enough to have one."

ALS attacks nerve cells and pathways in the brain and around the spinal cord. Total paralysis eventually takes over.

Derek's case is rare. The majority of ALS patients have an average lifespan of less than three years - Derek has now been living with ALS for nine years.

"As my arms and legs weaken, so too does my energy level, but not my heart," says Derek. "I feel that because ALS affects around 3,000 Canadians only, compared to some other conditions which affect hundreds of thousands of Canadians, there isn't enough awareness or funding for this disease."

Derek's purpose is to raise more than money. He wants to raise awareness of the disease. With his event being duplicated in several cities in North America, he is succeeding. And he has every intention of continuing his fundraising jumps with Jumping for "PALS" 3 scheduled for August this year where he expects over 60 skydivers to join him. Details can be found on his web site, www.waltoncure4als.ca.

Says Derek, "As my symptoms progress, I remain positive that a cure will be found. Maybe not in my lifetime, but one day. In the interim, I continue to raise awareness through public speaking engagements and my annual fundraiser for ALS research." •

THE MARRIED MEDICS

African adventures in medicine

Togetherness takes on a whole new meaning for married couple Dr. Michael Schull and Dr. Josée Sarrazin – whose 18 years since meeting in Sunnybrook's emergency room have seen numerous personal and professional highlights.

Dr. Schull, a senior scientist, and Dr. Sarrazin, who works in the medical imaging department, have three children, whom they uprooted for a year in 2009 to volunteer their medical expertise in Zomba, Malawi. The densely-populated southeast African country is blighted with low life expectancy and a high prevalence of HIV/AIDS.

"For us as parents it's important to preach by example," Dr. Sarrazin says of the sabbatical. "Not only did it teach the children appreciation of what they have, but it has opened their minds."

Born in Montreal, Ms. Sarrazin trained and has practised at the University of Montreal and the University of Toronto. Besides performing abdominal and pelvic radiology, she is an assistant professor in the department of medical imaging at U of T, and is involved in undergraduate teaching and specialty exams at the Royal College of Physicians and Surgeons.

While Ms. Sarrazin's extraordinary efforts in Africa – including working with Malawi's sole radiologist and training ultrasound technicians at two hospitals – marked her first experience volunteering abroad, Dr. Schull has a long history of helping impoverished countries.

Trained at Queen's University, with a masters in epidemiology and biostatistics from McGill University and a FRCPC in emergency medicine from the U of T, Dr. Schull is a staff emergency physician at Sunnybrook and a senior scientist at the Institute for Clinical Evaluative Sciences (ICES), where his research focus is health services, emergency services and quality of care.

He first volunteered abroad in 1991, in a hospital in South Africa. He then went on missions for Doctors Without Borders for a number of years, joining the organization's board of directors in 1997 and serving as president for five years. In 2004, he became a member of the Canadian board of Dignitas International, which helps people affected by HIV/AIDS in the developing world, and is now the board's chair.

The focus of Dr. Schull's work in Malawi was research and helping implement an innovative training and guideline program to integrate HIV/AIDS care with primary care. That work continues today, as he collects data to determine the effectiveness of the program.

The year in Malawi entailed many adjustments, especially for his three children, but Dr. Schull says the family sees it as a valuable experience. "The kids now have an understanding of poverty and Africa that they wouldn't have had otherwise," he adds. •

THE EPIDEMIOLOGIST

Accidents do happen, and he knows why

Dr. Donald Redelmeier earned the moniker "myth buster" for a quirky, eclectic brand of research studying the lifespan of Academy Award winners, how the weather might alter medical school admissions, and the effects of democratic elections on driving habits.

About 24 more people die in car crashes on U.S. election days than on an average Tuesday, as it happens. And the Director of Clinical Epidemiology at Sunnybrook considers voter queues more lethal for drivers than New Year's Eve celebrations or Super Bowl Sunday. It could be that drivers speed up to make up for lost time lost, take unfamiliar routes home, or become complacent on a day not normally associated with increased fatalities.

"Driving is such a commonplace activity and it seems so banal...misconceptions abound, which leads to driver over-confidence and the failure to take preventative actions," Dr. Redelmeier says.

At Canada's largest trauma centre, he meets the consequences of these inactions every day. "Unlike patients with pancreatic or uterine cancer, where it's hard for me to figure out where they could have done things differently...I see so much suffering and it all could have been prevented." He makes a list: buckling up, staying off of cell phones, and avoiding unnecessary lane changes.

"If you were my kids you'd have stopped me by now." None of his three children are old enough to drive, he says, "but I make them look both ways before they cross the street."

Dr. Redelmeier was drawn to the study of accident prevention in part due to the limitations in medical science to rescue trauma victims. "In half of all road crashes, the patient is dead within five minutes, leaving no opportunities for life-saving heroics." Survivors are often left with permanent damage.

Over more than two decades of research, first at Stanford University, where he did his medical residency and fellowship, and then at the University of Toronto, Dr. Redelmeier has challenged the way we think about driving. He was the first to study the effects of cell phones on drivers, and found that phone calls can be as dangerous as alcohol consumption. •

THE ECO-MANAGER

Guru of all things green

If you're a patient undergoing surgery, you're probably not thinking about the size of your surgery's carbon footprint — or that the body only absorbs about five per cent of administered anesthetic, while the rest is sucked out of chimneys, making hospital operating rooms a major source of greenhouse gas emissions.

"Hospitals are up there with factories ... We want to be cognizant of that and mitigate the risk," says Beverley Townsend, manager of environmental sustainability at Sunnybrook. Part of her green mandate is something called gas scavenging, in partnership with an Ontario-based company, Blue-Zone. A machine installed in ORs now absorbs the excess anesthetics, which are then broken down to produce new ones.

Beverley has been the green leader at the hospital for four years, the last two of which saw Sunnybrook win one of Canada's Greenest Employers awards.

Take composting: "Something that seems so simple is actually quite drastic." It's complicated with a staff of about 10,000 dispersed over 100 acres of facility comprised of different departments. There are food scraps, commercial packaging in gift shops and biohazardous materials. Beverley works with purchasers to incorporate more eco-friendly materials into hospital products and educates staff about waste management strategies.

Other key environmental strategies Beverley helped implement include transportation for a large staff of commuters, and energy conservation. Her background in chemical engineering and hospital management came in handy when she helped draft her own job description that was initially limited to energy management. "We decided to expand it," she says. Sunnybrook's energy initiatives will reduce CO_2 emissions by 8,965 tonnes annually — comparable to taking 1,410 cars off the road.

Numbers aren't the only change Beverley has noticed: "It's people's attitudes. It's a huge behavioral change and it didn't happen overnight. There's a lot more awareness surrounding environmental impacts." •

THE RESEARCHER

Cancer on her hit-list

Dr. Chloe Milsom has fifteen minutes to spare before a timer goes off; then the plasma samples drawn from her lab mice should be checked for protein levels.

The award-winning scientist is doing her postdoctoral fellowship at Sunnybrook Research Institute on a team under the direction of Dr. Robert Kerbel. The Kerbel group and Dr. Milsom's experiment are part of a research paradigm that might one day change the way anti-cancer treatments are administered.

Cancer is the leading cause of premature death in Canada. And while anti-cancer drugs like chemotherapy are generally effective, shrinking tumors significantly, the group has discovered what Dr. Milsom calls a "counterproductive effect." During recovery, she says, "there's an increase in growth factors. The host's cells are recruited to the tumour, enabling it to grow."

It usually takes three weeks for the body to recover from the toxic dose of chemo, which also depletes healthy cells. But it's during this recovery stage that the patient's cells mobilize toward the tumour. Dr. Milsom is looking for the source of these growth factors. She suspects blood platelets might be the cause, and she's one of the first.

"This is novel, because although platelets are known to play an important role in tumour progression...they have not been considered in terms of host response to treatment."

Administering higher doses of chemo several weeks apart has been standard practice for decades. But recent studies suggest a "low-dose regular interval therapy" could be an alternative to conventional chemotherapy, counteracting the tumour growth in the recovery stage.

At Leeds University in the UK, Dr. Milsom did her undergraduate degree in genetics and developed an interest in cancer. She moved to Canada with her husband ten years ago. She's since completed her PhD at McMaster University, where her supervisor inspired her research focus: blood vessel development in tumours. She calls the meeting "life-changing."

Now, her work could eventually support the case for low-dose chemo treatment, even if decades of standard practice don't change overnight. "You see success and it triggers clinical trials, but I think it will be some time before it's adopted routinely in the clinic." •

THE PARENT COORDINATOR

Mom is in the house

Kate Robson is taking the arduous task of a full-time mom to new levels, sanctioning it with an official job description at Sunnybrook's Neonatal Intensive Care Unit. Kate's job as parent coordinator is a new NICU position created just four months ago to help relieve some of the stress from anxious families, making her one of the first professional parents in Canada.

Kate and her husband began volunteering at Sunnybrook in 2006, after they were discharged with their first daughter. Maggie, now 5, was born a micro preemie at 25 weeks. Another parent lifted Kate's spirits after her first few days with Maggie left her "full of question marks." She says; "To understand that tomorrow might be very different, that it might be wonderful...that was life-saving."

When her second child, Grace, now 3, was born premature, a "typical feeder and grower," at 33 weeks, Kate worked on a parent project at Mt. Sinai, the hospital where Grace was born.

Parent coordinator wasn't an obvious transition from her job as managing editor at a mobile messaging company, but Kate feels a special empathy for parents of preemies that makes her eminently qualified. "I've had two different experiences at two gestational ages at two different hospitals. You have an idea of how it's going to go, and it doesn't always go that way, and that's what I want to help people to deal with."

Kate works as a liaison between Sunnybrook staff, parents, and the 1,200 babies admitted to the NICU every year. She organizes events for parents and advises staff on how to communicate with a family in crisis.

A master's in adult education and studies in dispute resolution at York University helps Kate broach difficult subjects and teach staff how to approach fretful parents, many of whom are thrust into a confusing situation. She focuses on "recognizing moments of joy," cherishing the milestones that mark a premature baby's first weeks and months — reaching a kilo and kangaroo carrying for the first time (each comes with a certificate Kate helped design), or the first time baby comes off of the ventilator. "We're not talking or walking or getting teeth yet. But there's a lot of joy in the NICU. It can be really wonderful." •

SUNNYBROOK - BURN

SPECIAL DELIVERY

When mothers are expecting more than one baby, they need highly specialized care throughout every stage of the process

Ian and Kelly McLean, doting parents of Elizabeth and Abigail.

New mom Kelly McLean's twins can be heard kicking up a fuss as she breaks from her hectic schedule in her Toronto home to discuss the unique challenges leading up to giving birth to more than one baby in one pregnancy.

But the 29-year-old Toronto marketing manager isn't fazed by her daughters' cries for attention, because she spent months worrying about much worse. Her first ultrasound after discovering she was pregnant in January 2010 detected a problem with the growth of one of the twins, likely linked to a placenta issue.

After seeing a specialist and at 18 weeks into her pregnancy, Kelly was referred to the multiples clinic in the Women & Babies Program at Sunnybrook. Dozens of Ontario women carrying twins or higher-order multiples (HOM), such as triplets or quadruplets, and classified as high risk, receive regular special care from program director Dr. Jon Barrett, nurse practitioners and other specially-trained staff.

"I had the worst pregnancy known to man, and we didn't think we would have the babies at all – we thought we were going to lose them," recalls Kelly. "I was also so sick and there were so many pregnant-lady complications – morning sickness, acid reflux – it was the normal stuff, but amplified times 10 because I had two babies inside me. It was hard to breathe, hard to walk, hard to do everything."

But thanks to Sunnybrook, which offers personalized care for high-risk women and their families before, during and after pregnancy, Kelly and her 31-year-old husband, Ian McLean, are now the doting parents of Elizabeth, nicknamed Libby, and Abigail, affectionately called Abbey. Born Jan. 5 by caesarean section some three weeks early – about standard for twins – Libby weighed 4 pounds 13 ounces, while Abbey entered the world one ounce lighter. These were hearty weights for multiples, especially given early concerns that Kelly may have had twin-to-twin transition syndrome, which causes too much nutrition to go to one fetus.

"The care I got was wonderful," Kelly says.

Given that one-quarter of all deliveries at Sunnybrook are considered high risk, and Sunnybrook's Level 3 neonatal intensive-care unit (NICU) cares for 20 per cent of all infants in the province weighing less than three pounds, there's great need for the specialized care that Women & Babies provides.

Of the 4,250 babies born at the hospital annually, about 300 are multiple-birth deliveries – which by nature carry a higher risk of complications than single-birth pregnancies, notes Dr. Barrett.

For that reason, expectant moms attending the multiples clinic get their blood pressure and other vitals checked, have an ultrasound and get it assessed by Dr. Barrett before they leave the clinic. It's common for clinic-goers to attend every other week and then increase that to weekly visits closer to giving birth.

"The beauty of [the clinic] is that for women at higher risk, any complications may be detected earlier than normal," says Dr. Barrett. "Women who come to the clinic deliver later on, and so have a lower risk of complications, and lower risk of being taken to the tertiary centre at Sunnybrook for emergency care."

Dr. Barrett notes that the generally low weight of multiple-birth babies is due to the fact that only about 10 per cent of them go to full term – pegged at 38 weeks for twins (compared with 40 weeks for single births), and even sooner for HOM births. If an expectant mom of twins, for instance, hasn't given birth by 38 weeks, she is induced to reduce the risk of stillbirth and other problems.

"The biggest possible complication of having twins or another multiple birth is prematurity – and with that comes a big risk for all sorts of consequences, from cerebral palsy to significant abnormalities," says Dr. Barrett. "The babies also may not grow as well because they're occupying one womb, and there are a whole lot of potential maternal illnesses, such as hypertension, diabetes, bleeding."

Such complications are especially a concern among older mothers, who have a higher chance of having multiple births because they more commonly get pregnant through in-vitro fertilization (IVF) – a reproductive technology that has boosted the incidence of multiple births by about 40 per cent since the early 1990s, according to Dr. Barrett.

While the Women & Babies Program is a referral clinic for women across the Greater Toronto Area, moms-to-be also come from further afield in Ontario. Many referrals have their babies at Sunnybrook; other women only attend the multiples clinic during pregnancy and then deliver at their "home" facilities if their pregnancies remain low risk. What makes this dual-care system work is the emphasis on record-sharing – all expectant mothers bring the medical and care files from Sunnybrook with them when they go to their regular doctors.

When Dr. Barrett isn't caring for expectant mothers and delivering a large percentage of the babies born at Sunnybrook, he's spearheading important research. For instance, a Twin Birth Study by Sunnybrook and about 120 other hospitals from around the world aims to determine whether it's best for moms to deliver by caesarean section or vaginally. The randomized blind trial, involving about 2,800 women giving birth at 32 to 38 weeks gestation, began a decade ago and is expected to conclude in the coming months.

Such research is helping guide the care of women like Lindsay Allen, a 32-year-old sourcing expert at a Canadian bank who, at the time of writing, was expecting twins as a result of IVF.

Lindsay, who lives in Ajax, Ont., was referred to the multiples clinic because through the five years of trying to start a family with her husband Richard Allen, she has had a single-fetus miscarriage, and then carried twins who were born at 24.5 weeks and failed to survive after the amniotic sac burst early.

Lindsay said care at Sunnybrook for her latest pregnancy focused on ensuring no infection developed, and everything was going according to plan. "These babies are very anticipated by both sides," she said, noting it will be her parents' first grandchildren.

Kelly, meanwhile, not only gave birth to healthy girls – save for some early hypoglycemia that required monitoring in the NICU shortly after birth – but in February this year also passed her own post-op checkup with Dr. Barrett.

`"He was very on the ball concerning my case and wanted to make sure everything was OK," she says. As for the babies, "They're eating, they're crying, they're great, and Abbey is actually bigger than Libby now."

GOT DONOR MILK?

The mantra "breast is best" is especially relevant to premature and critically ill babies. Immune system-boosting and nutrient-rich mother's milk is associated with better brain development, and such high-need infants are at higher risk of developmental problems.

But mothers of babies such as multiple-birth infants – who are at highest risk of feeding and health issues – can't always provide the milk required for their little ones. As a result, pasteurized human donor milk (PHDM) is commonly used for critical, early-life feeding.

But with the closing of nearly two dozen human-donor banks in the late 1980s because of concerns over HIV transmission in breast milk, BC Women's Milk Bank housed at BC Children's Hospital in Vancouver is the only remaining source based in Canada.

Sunnybrook – the only neonatal intensive-care unit (NICU) in Ontario using PHDM, for about 370 babies annually – needed more donor milk than the Vancouver facility could provide, so five years ago started shipping it to Toronto from a Columbus, Ohio, bank.

"The benefits of breast milk have really come to light fairly recently; people are really starting to rethink breast milk," says Dr. Eugene Ng, clinical director of Sunnybrook's NICU. Dr. Ng is also a key figure in the research and other work aimed at opening a Toronto-based milk bank that he believes would help cut down on potentially dangerous informal sharing of breast milk outside hospitals.

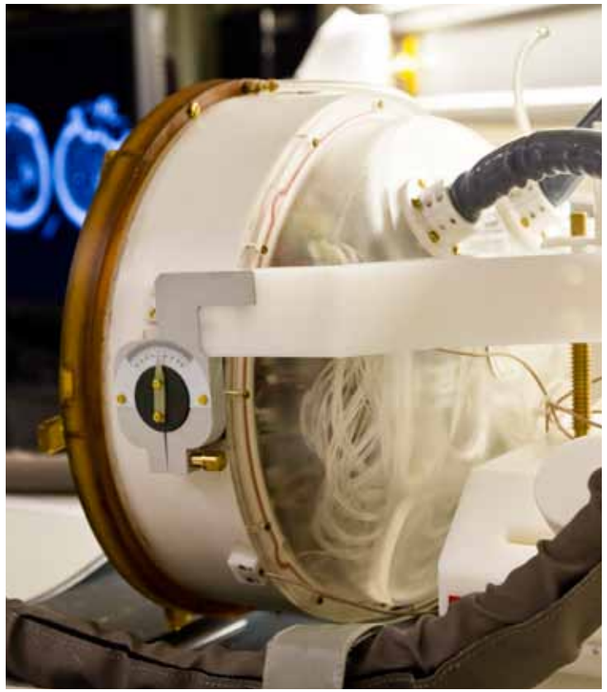
Lactating women donating milk used by hospitals like Sunnybrook go through strict donor screening, and the milk itself must pass strict pasteurization and safety standards.

Currently, the hospital provides donor milk to about 200 babies annually with a birth weight of under three pounds for at least 14 days, and about 170 with a birth weight between three and 4.4 pounds for up to five days, says Dr. Ng, who is also deputy chief of the department of newborn and developmental pediatrics. About 90 per cent of mothers provide consent for such feedings, he adds.

Sunnybrook, Mount Sinai Hospital and the Hospital for Sick Children are discussing establishing a shared milk bank in Toronto.

RESEARCH

a quick look at some of the cutting edge research happening at Sunnybrook



Sunnybrook researchers are (left) developing a space-age looking helmet to deliver ultrasound to the head and (above) studying the use of a stop clock in emergency stroke admissions.

(Above) Dr. Anthony Feinstein's research shows that long-term marijuana use significantly impairs thinking skills of MS patients. (Right) A team is looking for genetic mutations in an aggressive form of breast cancer.

TIME IS BRAIN

A stopwatch can save a brain. At least that's the hope. When a stroke stops blood from getting to the brain, millions of brain cells die by the minute. Every second counts, so clot-busting drugs need to be administered as soon as possible.

A new study is testing the effectiveness of using a large red LED stopwatch clock in getting patients treated faster. This stopwatch, attached to the patient's stretcher from the moment of arrival in the emergency room, serves as a constant visual reminder of the urgency of the situation. Seems simple, but if it proves effective, its use will become the standard of care and will be expanded to other stroke centres across Ontario and around the world.

THE ULTRASOUND HELMET

Sometimes there are few options when a brain tumour is in a place where it can't be reached with a scalpel. But we think we have an answer – using focused ultrasound to zap tumours. Not as easy as it sounds. Because the skull is so hard and thick, it sends ultrasound waves bouncing off in all directions. The solution: a high-tech helmet.

Our scientists are building a new helmet to counteract that effect and hone in waves of ultrasound through the skull directly onto tumours and other diseases in the brain. Testing is in very early stages, but if it works the way we expect it to, people who had little hope will one day have a new, potentially life-saving option for treatment.

SPOTTING DEMENTIA FROM AFAR

They might seem like fun mind games, but two tests, administered by professionals, have been found to predict the onset of dementia up to 10 years before it's diagnosed. One test involves remembering a list of random words after a short delay between when the words are heard and when they're repeated back. The other involves matching symbols with numbers.

The ability to predict dementia is important because it allows identification of people who could benefit from clinical trials or other treatments as they become available. It'll also help us understand the long-term effects of dementia and its progression in the brain, ultimately assisting in the design of future treatments.

A NEW WEAPON AGAINST DIABETES?

Diabetes is a complicated disease that causes a number of problems for sufferers. One of the most dangerous, aside from the disease itself, is chronic wounds, mostly on the feet. In severe cases, this problem can result in amputation.

A Sunnybrook research team has invented a compound, vasculotide, which imitates protein and stimulates new blood vessel growth. So far very early studies have shown that it speeds the healing and closing of wounds – and keeps them closed. Vasculotide holds potential hope not only for diabetics, but has implications for treatments in cancer, acute lung disease and hardening of the arteries.

KILLING CANCER AT THE SPEED OF LIGHT

Imagine if light could kill cancer in bone. That's what our researchers are investigating using light-sensitive drugs. It's called photodynamic therapy, where a light-sensitive drug accumulates in a tumour, then light is applied to the cancer through a laser inside a needle. This causes a form of oxygen to be produced that destroys the cancer cells and shrinks the tumour. Amazingly, this therapy was also found to strengthen the bone around the tumour. A clinical trial testing this therapy in tumours in the spine is underway.

HOW MUCH EXERCISE IS THE RIGHT AMOUNT?

In our last issue, we told you that physical activity in adolescent girls has lifelong brain benefits. Another Sunnybrook study says that we shouldn't over do it, though. Overly strenuous activity in women throughout life is related to poorer performance on tests that predict dementias.

The link is thought to be related to levels of estrogen, which are reduced by strenuous exercise, like marathon running. The study suggests that further investigation of the effects of intense physical activity on brain function is needed to figure out the optimal exercise regimens.

MS: IT'S NO TIME TO TOKE

New Sunnybrook research shows that using dope is dopey for multiple sclerosis (MS) patients. It causes even poorer performance in brain skills already affected by the disease. The study of 25 users of street cannabis and 25 non-users, all with MS, found that the drug significantly worsens attention span, speed of thinking and processing information, working memory and other cognitive skills.

"What this tells us is that MS patients need to be made aware of these effects and weigh whatever benefits with the very real cognitive side effects" says Dr. Anthony Feinstein, lead investigator of the study and neuropsychiatrist at Sunnybrook. The study was funded by the MS Society of Canada.

WHAT'S IN BREAST CANCER'S DNA?

Using a next-generation genome sequencer, Sunnybrook scientist Dr. Arun Seth is studying the pathology of triple negative breast cancer, an aggressive form of the disease for which there is no effective treatment. Called the SOLiD 4, this machine will be used to find genetic mutations in breast cancer cell genomes.

The SOLiD 4 will allow Dr. Seth and his team to map and compare data from dozens of patient biopsies. Once the genomics of this deadly disease are understood, new therapy strategies and personalized treatments can be developed, giving new hope to women affected by it.

I will survive

Women who receive the much-feared diagnosis are finding hope at Sunnybrook, with its menu of tailor-made programs to target specific forms of breast cancer

by Celia Milne
photography by Tim Fraser

Anne Cheung: 'This is a chapter past and I'm starting a new one.'

It was November, 2007, and Toronto pharmacist Anne Cheung was planning a family holiday. She had felt a hard lump on the right side of her chest, near her sternum, and thought, "something is off there." But, she said, "I was in a bit of denial, saying 'It can't be.' "

So, the then-44-year-old visited her GP, had a mammogram in December, and focused instead on a Christmas holiday with her husband Ron and their children, 14-year-old Colin and 11-year-old Veronica. "We love going to New York over the holidays and shop."

Anne, who describes her experience in a cheerful, matter-of-fact way, recounts that, right after the holiday, she learned from her GP that the mammogram showed the lump was suspicious.

Next step: a biopsy.

She chose Sunnybrook's Odette Cancer Centre to have this done because she says she knew it was a great hospital and it was close to her children's schools. The diagnosis was shocking and frightening: She had cancer – a type called locally advanced breast cancer (LABC).

LABC is a type of cancer that may spread to other areas near the breast, including the lymph nodes, but does not appear beyond the breast and lymph node region. Anne's was a cluster of small cancers that together added up to close to 5 centimetres.

The next eight months would be gruelling, but Anne always felt comforted by the care at Sunnybrook. "When I was going through this, I felt I was in good hands. The doctors and nurses reinforced that, and had a calming effect. The building has lots of daylight, so the brightness helps a lot. It is welcoming … not a scary place."

The Odette Cancer Centre is a one-stop shop for the full spectrum of care, from prevention and screening to imaging diagnostics, surgery, radiation, medical oncology and post-treatment care. "The nature of what we're doing here is providing a centre that women can come to for total breast care," said Dr. Eileen Rakovitch, site leader in the breast program and a radiation oncologist. "We are looking at the full spectrum. What do women with breast cancer need that they are not getting in other centres?"

Anne's course of treatment was designed specifically for her, as the Odette Cancer Centre has programs specially geared to different types of breast cancer.

"Each patient is different, and each has a different path to follow," said Dr. Rakovitch. "Each woman will receive a tailored treatment plan by a team of health professionals who specialize in the specific type of breast cancer."

Sunnybrook has one of the largest breast cancer care centres in the country, with 35 physicians and growing. Plans are under way to move the breast cancer program into new digs. The new breast cancer centre will create 20,000 square feet of dedicated space on two floors of M Wing.

DID YOU KNOW?

One in every 15 women diagnosed with breast cancer in Canada is treated at Sunnybrook

Sunnybrook Foundation is raising money to complete the centre, with $14 million still to be raised from the community. "It is going to be a wonderful resource for patients for screening, diagnosis, and treatment," said Dr. Rakovitch.

One of the strengths of the Odette Cancer Centre is that, alongside excellent clinical care, the hospital conducts internationally-recognized research and education. Patients have access to leading clinical trials so they can be part of the latest in improved treatments and research. In Anne's case, she qualified for a clinical trial in which she would receive radiation and chemotherapy with Taxotere before surgery to shrink her tumour.

But the decision to participate in the trial was agonizing.

She discussed the pros and cons with her medical oncologist, Dr. Rebecca Dent, who is head of breast cancer clinical trials at Sunnybrook, as well as her radiation oncologist, Dr. Jacqueline Spayne. "Drs. Dent and Spayne were very good at explaining everything to me. They explained how my cancer could be touching the chest wall muscle and this approach could help tremendously."

Once Anne agreed to enrol in the clinical trial and a start date was set, she felt relieved. "Now there is a plan," she said. "That's the way we explained it to the kids."

Having a plan also helped her deal with her emotions, and helped the family have some kind of certainty amidst the uncertainty, as she put it. Now it was »

Breast Cancer Program clinicians of many disciplines, regularly meet to share expertise in the personalized care of each patient.

Dr. Eileen Rakovitch (on right), leader of the Breast Cancer Program: 'We provide a centre that women can come to for total breast care.

Nurse Sharon Lemon-Wong (right) guided patient Anne Cheung through her time at Sunnybrook.

"I felt there was a whole team there who knew my case. To me, it's the continuity; you don't feel like you're falling through the cracks."

– Anne Cheung

time, she said, to build trust with the health care team, who mapped out a treatment plan: radiation every weekday for five weeks and chemotherapy on the first day of each week for seven weeks.

The next difficult decision was about the mastectomy - whether to have one or both breasts removed.

"Again it was decision time," she said. She was tempted to have both breasts removed, to remove the risk of cancer developing in the left breast. "At that point, you are so aggressive in your mindset."

But Dr. May Lynn Quan, her surgical oncologist, gently suggested she just go for a single mastectomy on the right side, and to consider later a mastectomy on the left side as a preventative measure. During recovery, Anne was relieved she took that advice. "The reality is, whenever you cut something off, you are losing part of you. There's no going back and there could be regret in removing a healthy breast. Dr. Quan understood this and helped me make the right decision for me."

Anne opted not to have reconstruction surgery. But for women who do pursue this option, Odette Cancer Centre offers a program that allows them to meet their surgical oncologist and plastic surgeon at the same time, and to have their mastectomy and reconstruction surgeries done together. Women may also choose to have the reconstruction done at a later date.

This kind of collaboration is what Sunnybrook is all about. And Anne felt it. "They work as a team. It was a collective. I felt there was a whole team there who knew my case. To me, it's the continuity; you don't feel like you're falling through the cracks."

Anne began her treatments on Feb. 22, 2008, and finished her last dose of chemo on Sept. 17 that year. Through all the ups and downs, Anne relied upon registered nurse Sharon Lemon-Wong, whom she calls "my constant contact."

Her ordeal is over, but, like many breast cancer survivors, what lingers is a constant fear that the cancer has metastasized somewhere in her body, and will return. "That is the most feared thing," she said. "You feel a pain and think, 'Oh my God, is it cancer? Oh no, here we go again.' "

To reduce her chances of recurrence, Anne is now involved in a three-year phase III clinical trial designed to determine whether a class of drugs called bisphosphonates are beneficial in preventing the spread of cancer to other parts of the body.

Now 47, Anne is enthusiastic about her future. She has an effervescent smile as she describes plans to travel with Ron and the kids, enjoy life and to find meaningful ways to help others, such as volunteering at Willow Breast Cancer Support. "Certainly there is clarity of thinking at the end," she said. "This is a chapter past and I'm starting a new one."

NO MORE WAITING: The New Rapid Diagnostic Unit

Right now in many health care systems it can take up to 42 days for a woman to get a breast-cancer diagnosis: a long wait from the time she finds a lump herself, her GP finds one, a mammogram shows an abnormality, or an ultrasound reveals something peculiar. "This is not acceptable, it is stressful for the woman, her family and the clinicians," says Angela Leahey, an advanced practice nurse at Odette Cancer Centre.

In the Fall, Sunnybrook is opening its new Rapid Diagnosis Unit, which will provide a diagnosis to women by the next day. The new unit is a collaboration between the Breast Cancer Program, pathology and imaging departments. Ms. Leahey and the rest of the team have been working hard to compress a weeks-long process into one day. "I realize from being an oncology nurse that having to wait any length of time is extremely stressful. As much as this is a lot of work, I feel really good about the possibility of offering this to patients."

POST-TREATMENT CARE

Women are living a long period of time after breast cancer, says Angela Leahey at Odette Cancer Centre. While this is good news, women who have survived breast cancer have many unmet needs. They may be dealing with fatigue, treatment-induced menopause, loss of fertility, body image issues, inability to concentrate, sexuality issues, bone health, weight gain, and worry that the cancer will come back.

To address these needs, Sunnybrook is developing a tailored care package. "We call it post-treatment care," says Ms. Leahey. "We want to bridge the gap and set them on a supported path."

Young, high-risk, and taking charge

At the age of 29, Tonia Sultana of Ajax, Ont., received the news: she has a 50-per- cent chance of developing breast cancer before she reaches 50. Tonia tested positive last summer for the BRCA1 gene mutation linked with hereditary breast and ovarian cancer. Her aunt had died of breast cancer at 38 and her mother was ill with breast cancer twice before she was 38.

Tonia and her husband have two children, a son aged four and a two-year-old daughter.

"My aunt left behind a three-year-old. My mother is fine but it has been challenging. As a kid, I watched her get sick. The doctor called her and told her the cancer was back. I watched her face. I knew it was difficult for her and it hurt me to see her this way. Today there are more things I can do so my family and I won't have to go through that," says Tonia.

For Tonia, these preventive measures included having had her ovaries and fallopian tubes removed in early February and having her breasts removed at the end of the summer.

"I'm going to lose my breasts because I say so, not because cancer tells me to," Tonia says. She has entrusted her care to doctors at the Odette Cancer Centre at Sunnybrook, where a revolutionary new collaboration allows her to have a double mastectomy and breast reconstruction surgery together.

Women like Tonia who are at elevated risk for breast cancer receive special care and monitoring at Sunnybrook's high-risk breast clinic. Some women, in consultation with the health- care team, may choose aggressive preventive measures like Tonia did, and other women are comfortable with increased screening.

"At the clinic, each woman's individual risk factors are assessed and doctors provide recommendations for screening, risk reduction and ongoing surveillance," says Dr. Sandra Messner, an expert in breast cancer prevention at Sunnybrook's Odette Cancer Centre.

– Celia Milne

DIFFERENT TYPES OF BREAST CANCERS

These are the main types of breast cancers for which Sunnybrook provides care and expertise.

- Ductal carcinoma in situ (DCIS). About 20 per cent of cancers diagnosed through mammographic screening are this type of non-invasive breast cancer, according to Dr. Eileen Rakovitch at Odette Cancer Centre.
- Low risk, early stage invasive breast cancer – revolutionary Breast Brachytherapy post-operative one-hour treatment.
- Triple negative. This is a subtype of breast cancer which is characterized by a lack of three receptors that are usually targeted in treatment. Triple-negative breast cancer is estrogen receptor-negative, progesterone receptor-negative and human epidermal growth factor receptor 2 (HER2) negative. Treatments that target these receptors aren't effective, but chemotherapy – especially when done early and aggressively – often is.
- LABC, or locally advanced breast cancer. This is a type of cancer that may spread to other areas near the breast, including the lymph nodes, but does not appear beyond the breast and lymph node region.
- Breast cancer in young women. Odette Cancer Centre has a new program called PYNK, supported by Rethink Breast Cancer, to address breast cancer in the under-40 age group. Their needs are very different from those of older women.
- Metastatic cancer that has spread beyond the breast and lymph nodes: Bone Metastases Clinic. And Odette Cancer Centre has experts in pain management, radiation and palliative care to address the needs of this population at the Palliative Care Clinic.

ARE YOU AT RISK?

Dr. Sandra Messner, an expert in breast cancer prevention at the Odette Cancer Centre lists some risk factors and some risk reducing strategies for any woman:

MAIN HIGH-RISK FACTORS:

- Family history of breast and or ovarian cancer, particularly if diagnosed under age 50, especially if multiple cases on one side of the family
- Previous abnormal surgical biopsy (e.g. atypical cells, lobular carcinoma in situ)
- Previous high-dose radiation to the chest wall given before age 30 (e.g. for Hodgkin's lymphoma)
- Extremely dense breasts on mammogram

At any level of risk it helps to:

- Be moderately physically active (at least 30 minutes on most days of the week)
- Achieve and maintain a healthy weight
- Minimize alcohol intake

CHESTNUT PARK

FROM SURGERY TO FINISH LINE IN RECORD TIME

An innovative new heart bypass technique made sure one man's passion for long-distance running was only briefly put on hold

As Emil Boychuk pounded down the final stretch of the half-marathon, he picked up his pace. The adrenaline was surging, the sun was shining and hundreds of people lined the route cheering. When he hit the finish line, "it was one of the most memorable moments of my recent life. It was a tremendous victory."

Quite right. Only 19 months earlier, in March 2009, he was waiting for bypass surgery at Sunnybrook's Schulich Heart Centre. The idea of running at all much less a 21.1-kilometre race wasn't even on the chart.

"One of the things that I had done quite faithfully" since 1982, Emil said in an interview from his north Toronto home, "is the Terry Fox Run every fall." But as other priorities took more time, training dropped off. By the summer of 2008, at the age of 61, "I just felt I was out of shape and I figured, 'Well, I have to get back to my running schedule.' "

Then he found out he had heart disease. A bout of angina, a trip to the emergency department and, two days later, at Sunnybrook, he had two stents put into an artery that was 90 percent blocked.

"After I had my stents, I felt great. I joined the Toronto Rehab [cardiac] program and I built up my heart, my soul and my fitness to the point where I was able to start jogging." But a midterm exam found an irregular heartbeat and an angiogram showed blockage in front of the stents. The only solution, he was told, was a single bypass. The thought of having his chest cracked open was, to say the least, unnerving.

Fortunately, Dr. Fuad Moussa had other plans. He was spearheading an innovative procedure at Sunnybrook, minimally invasive beating-heart coronary bypass surgery, and felt Emil was a good candidate. Instead of splitting the breastbone and stopping the heart, the surgeon makes a five-centimetre incision under the left breast and the heart keeps pumping on its own. On March 4, 2009, Dr. Moussa performed the surgery on Emil and another patient, the first time the procedure had been done in Toronto.

Instead of the usual six to eight weeks of initial recovery, Emil says, "after two weeks I was quite comfortable walking around … [and] about a month after »

Emil Boychuk was up and running – literally – within only a few months of his single bypass operation.

the surgery I was able to go back to work" as a guidance instructional leader with the Toronto District School Board. Still, running a half-marathon "seemed to be a pretty lofty goal. I think for a long time I was simply hoping to do a little bit of jogging again."

But he resumed the rehab program and in September finished the Scotiabank Toronto Waterfront Marathon`s five-kilometre walk/run in 45 minutes. New objective: the half-marathon. When he finished the cardiac program in November he used an online training program and organized runs to stay focused. It worked so well that less than two weeks before the race, he beat the half-marathon distance.

On Sept. 26, 2010, armed with a heart monitor and watch to guide his pace, Emil was ready and steady along the waterfront route. Then, at the 20-km mark "there was lots of excitement, a lot of people on the sidelines doing a lot of cheering and I was very energized … the time just flew and my legs felt strong and I think the best speed of my race was during that last kilometre. … My adrenaline was probably at an all-time high."

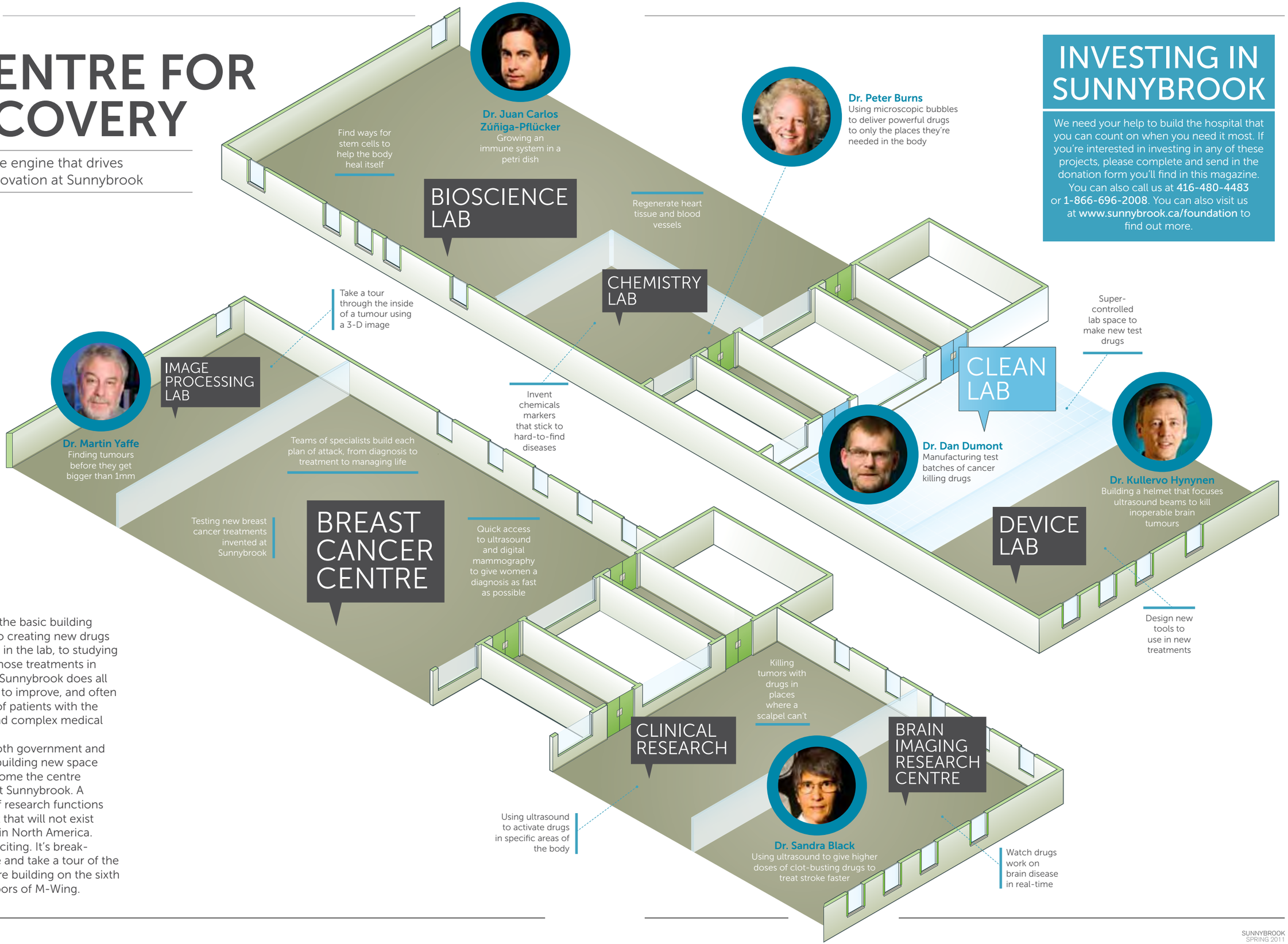
His goal: 2 hours 30 minutes. His elapsed time: 2 hours 29 minutes.

HOW THE SURGERY IS PERFORMED

- The left lung is deflated and a respirator delivers oxygen to the right lung only.
- Surgeons make a 5-6 cm incision just under the left breast and insert a retractor.
- They identify the target vessel for bypass. This is usually the anterior descending artery, the most important vessel on the heart.
- Surgeons use a special retractor to help harvest the artery on the inside of the chest. This is the left internal thoracic artery.
- Next, they pass a specialized stabilizing device into the chest through a separate 1 cm. incision, to immobilize the heart in the area of the target artery. This area becomes still while the rest of the heart beats.
- The target artery is opened and surgeons connect the internal thoracic artery to it using fine stitches.
- Once they are satisfied that everything is good, the stabilizer is taken out, the left lung is allowed to expand and a drainage tube is placed through the 1 cm incision.
- The incision in the chest is closed and the patient is transferred to the intensive care unit where the breathing tube is taken out and the patient can be monitored closely. Patients who have this surgery generally stay in the intensive care unit for about 12 hours and in hospital for about five days.

A CENTRE FOR DISCOVERY

Research is the engine that drives life-saving innovation at Sunnybrook



From studying the basic building blocks of life, to creating new drugs and treatments in the lab, to studying the effects of those treatments in clinical trials – Sunnybrook does all of these things to improve, and often save, the lives of patients with the most critical and complex medical problems.

Funded by both government and donors, we're building new space to that will become the centre of innovation at Sunnybrook. A combination of research functions and equipment that will not exist anywhere else in North America.

It's big. It's exciting. It's break-through. Come and take a tour of the new space we're building on the sixth and seventh floors of M-Wing.

INVESTING IN SUNNYBROOK

We need your help to build the hospital that you can count on when you need it most. If you're interested in investing in any of these projects, please complete and send in the donation form you'll find in this magazine. You can also call us at **416-480-4483** or **1-866-696-2008**. You can also visit us at **www.sunnybrook.ca/foundation** to find out more.

ILLUSTRATION BY STEVE ADAMS

LETTING GO

Family members are in a painful position when confronted with a terminally-ill relative. Desperately wanting their loved one to live, yet knowing that they would want to die with dignity, they face a heart-wrenching decision

by Naomi Carniol

It had been a difficult year.

Ted Boduryan, 83, had already been admitted to hospitals three times for pneumonia. Each time, after a few days, he recovered enough to be discharged. In June he was admitted for pneumonia again to Sunnybrook.

Sunnybrook is a busy place. Each year, about 1 million patients are cared for by thousands of staff, including doctors, nurses, physiotherapists and other health care professionals. In the midst of all this, there are moments of joy, and moments of sadness.

Sunnybrook's critical care units provide health care to patients who have, or are at risk of developing a life-threatening injury or disease, or who've had major surgery. These patients may need life-support, such as a mechanical ventilator, during a period of acute illness.

Most patients, such as those post-surgery, are in a critical care unit just a few days, until they are stable enough to be transferred to another part of the hospital. Others stay longer, for many weeks or in rare cases, many months.

In Ted's first few days at Sunnybrook, he was often awake. "He would see us and he would smile," his son Arthur Boduryan says.

Ted was connected to a ventilator for a few days. It helped. He was able to breathe on his own. "We were thrilled," Arthur says. "We had hope." Ted was transferred out of the critical care unit.

But soon he was unable to keep breathing on his own. He was transferred back to critical care and connected to a ventilator. In the weeks that followed, Ted needed the ventilator more often than not. He slept more frequently.

Arthur visited his father every day. "I found it really hard to be there for a long period of time," Arthur says. It was tough to see his once-active father hooked up to a ventilator, looking weak and at times, uncomfortable.

When his father was awake, he couldn't speak because of a tracheotomy. Sometimes he tried to write notes to visitors. After four weeks in the hospital, Ted wrote the word "suicide."

For some patients, the experience of being in the critical care can be a difficult one, Sunnybrook critical care physician Rob Fowler says. To be on a breathing machine requires a breathing tube in someone's mouth or a tracheotomy. Many patients aren't well enough to be fully conscious when in the critical care unit. Those who are awake are often too weak to stand up and unable to do things for themselves. "We try to make it as comfortable as we can," Dr. Fowler says.

Sometimes health care teams find therapies they've tried aren't working. After exhausting the therapies that could realistically help a patient, "we sometimes get to a point where we know we're not going to get people better," Dr. Fowler says. "And that's the most challenging part of being a doctor, when you are unable – as much as you might hope otherwise – to help someone recover," he says.

At two months, Ted was still in the intensive care unit. Ted's doctor called a meeting, explaining that despite efforts to help him, he was unable to breathe on his own. His muscles were weak from eight weeks in bed.

Arthur had the authority to turn off the ventilator, but wasn't ready. "I said, 'There's no way I would do it. It doesn't feel right.' " The doctor respected Arthur's decision.

It's difficult to tell families nothing more can be done to help a patient get better. People react to the difficult news in a variety of ways. Some accept it. Others "have a very, very hard time accepting that and are hoping for something more that can be done, sometimes hoping for a miracle equivalent," Dr. Fowler says. "Although our primary role is to do what we can to get people better, sometimes, an equally important job is that to make sure we don't set someone up for false hopes that a miracle will happen."

In cases where the health care team is unable to help patients recover, "we want to make sure we are focusing on keeping patients as comfortable as we can and not get into a situation where we are no longer prolonging life, but are prolonging a dying experience that may be uncomfortable," Dr. Fowler says.

At three months, Ted was rarely awake. His heart was getting weaker. His kidneys started to shut down. He needed dialysis.

Arthur and his partner, Ted's girlfriend, two cousins and two friends attended another meeting with his medical team. "It's just going to get worse," the doctor said. Ted's body was shutting down. Arthur appreciated the doctor's honesty and straightforward way of talking without medical jargon.

The nurses, doctors and other staff in a critical care unit are devoted to providing compassionate care. Sometimes that means administering pain medication to make patients more comfortable. Other times it means providing anxiety medication to take the edge off. And sometimes it means talking to family members about end-of-life decisions.

Doctors encourage people to "think about what they believe the patient would want, as opposed to what our personal desires are," Dr. Fowler says. "We all want our loved one to live and to thrive and do well, but it's another question in that situation if the patient was able to participate in the discussion, what would they want you to do?"

Arthur thought about the busy life his father had led. Even in his 80s, Ted enjoyed attending operas and gala dinners with his girlfriend. He travelled on cruises. He was a VIP at a casino.

That September weekend Ted hadn't opened his eyes. Arthur knew being stuck in a bed, unable to talk and unconscious wasn't a life his father would want. Ted's will made that clear.

Plans were made to turn off the ventilator later that week. "This is what my dad wanted," Arthur says. "I just never thought I'd have to face anything like that."

End-of-life decisions can be excruciating for families. Those who work in a critical care unit try to ensure families have supports that can help, whether that's other family members, friends, social workers or spiritual support.

For some families, having a religious ritual beside a patient's bed provides comfort. Klara Siber, a spiritual care provider who works in Sunnybrook's critical care unit and cardiovascular intensive care unit, has arranged everything from Aboriginal drumming to chanting by Buddhist monks to take place bedside. She has a roster of clergy of different faiths that she calls on, depending on patients'

and families' needs.

The day of the family meeting, Arthur left the hospital. At midnight, the hospital called and said Ted was having trouble breathing, no matter how much oxygen he was given.

Arthur – and everyone else who had been at the family meeting – rushed back to the hospital, including Ted's doctor who wasn't on call that night.

Arthur saw his father struggling to breathe. "As soon as I saw that, 'I said we have to do this.' "

Some families want to be present when a ventilator is turned off while others ask to return after the breathing machine is turned off. "Most families very much appreciate the opportunity to be very close to their loved one in and around the time of death," Dr. Fowler says.

Curtains were drawn around Ted's bed. The ventilator was turned off. "If you are going to die, it was the most beautiful way of dying," Arthur says. "There were eight of us by his bedside, holding his hand, telling him we loved him."

A voice for palliative care

A few months before his father passed away, singer John McDermott promised him that if his music career took off he would find a way to give back to the veteran community. "My dad was a World War II veteran. My mother's brother, my Uncle Mike, died as a PoW .... We had three cousins killed in Vietnam. So there has always been a quiet respect for veterans," says the tenor, whose breakout record *Danny Boy* has led to a career of more than 15 albums, including three Canadian platinum records and five Juno nominations.

Through the new foundation McDermott House Canada, Mr. McDermott has pledged to raise $3.6 million for Sunnybrook's palliative care unit, which is located in the same building as the Veterans Centre where Mr. McDermott gives a holiday concert each year for veterans and their families. Funds raised will transform the unit from a hospital-like environment into more of a home-like setting. Common areas, including hallways, a kitchen and a lounge, will be warm and inviting with comfortable furnishings. A children's play area will be added as well as an area with computers and Internet access. This will allow families to remain in touch with their business and also allow patients and families to interact with relatives who live outside the city.

It's not just common areas that will get a makeover. A few years ago, when a friend of Mr. McDermott's was dying, the friend's hospital room regularly had four or five people in it, laughing and remembering. "It was a celebration of his life," the singer says. "It struck me you are capable of doing that if you can get privacy." Funds raised will help increase privacy for the palliative care unit's 32 beds. The unit also hopes to add built-in beds for family members who want to sleep over as well as showers for family members.

INNOVATION

the latest in leading-edge developments at Sunnybrook

He's got game: Dr. Calvin Law uses a Kinect system to manipulate medical images during surgery.

XBOX IN THE O.R.

Dr. Calvin Law, a liver cancer surgeon at Sunnybrook's Odette Cancer Centre, is standing in front of an Xbox Kinect, waving his hands in the air and having a great time. But Dr. Law isn't playing video games; he's working in a live operating room.

It's a clever new application for this gaming system, allowing surgeons like Dr. Law to manipulate medical images, like CT scans, with the wave of a hand. And the benefits are huge. Usually, a patient's imaging is located on a computer screen outside the sterile area of the OR, meaning surgeons can't directly adjust the view. But thanks to the creative thinking of Matt Strickland, a general surgery resident and engineer who co-developed this innovation with colleagues Jamie Tremaine and Greg Brigley, that's changing.

"For all surgeries, especially cancer surgeries we do today, image guidance is key to helping the surgeon pinpoint the tumour and to save as much healthy tissue as possible," says Dr. Law. "It's like GPS for your car. This is going to change the way we interact with our imaging in the operating room, potentially forever."

SMALL PILL, BIG DIFFERENCE

After hip or knee replacement surgery, patients risk developing blood clots in their veins, or having one of those clots travel from their legs to their lungs, which can be fatal.

Dr. John Murnaghan, associate scientist at Sunnybrook Research Institute and Dr. W. Geerts of the Thromboembolism Service have been studying the the use of Rivaroxaban (trade name Xarelto), a new oral anticoagulant approved by Health Canada in 2008, but still not widely used. Until recently, doctors used the anticoagulant Coumadin to prevent clot-related conditions such as deep vein thrombosis (DVT) or pulmonary embolism (PE). But it takes several days to take effect and not all patients achieve a therapeutic level of anticoagulation by the time they are discharged.

Dr. Murnaghan and his group has followed-up the results of Rivaroxaban on 700 joint-replacement patients for a three-month period since June of 2010. Early results are promising, he says. "It seems to be minimizing the complications we're trying to avoid without creating another whole group of problems."

GPS TECHNOLOGY IS CLOSER TO THE HEART

A new, high-tech robotic lab is helping cardiologists at Schulich Heart Centre zap away patients' irregular heart rhythms with exact precision to restore normal heart function. "Our new lab is home to a cutting-edge system from Stereotaxis that uses computerized, magnet-guided technology to enhance the precision and safety of heart procedures," says Dr. Eugene Crystal, cardiologist and Director of Arrhythmia Services. "It is revolutionizing how we treat our patients with cardiac arrhythmias."

Cardiac arrhythmias occur when the electricity that flows through the heart to trigger the pumping action 'short circuits' or gets blocked – disturbing the heart's normal rhythm. If left untreated, it can lead to heart attack and stroke.

During the procedure, powerful magnets are positioned near the patient while a cardiologist operates the system from a control room. GPS technology enables the physician to pinpoint the precise location of the faulty electrical site, position the catheter there and deliver the required treatment to restore a normal heart rhythm.

THE VIRTUAL PHARMACIST

It's a cool green machine that looks like an ATM, but instead of handing out bills, it dispenses pills.

In partnership with remote-health care technology provider PharmaTrust, Sunnybrook's Holland Centre is one of the first locations to house a MedCentre kiosk. It provides patients with virtual access to a full range of pharmacy services before they leave the hospital after hip or knee replacement surgery. The kiosk uses advanced robotics, scanning, and live videoconferencing to connect patients to a pharmacist in another location. The pharmacist, using a digital scan of a prescription, advises on the medication, answers questions and then directs MedCentre to release the medication to the patient.

Due to the project's success, the collaboration is set to launch version 3.0 of MedCentre at the Holland, which will be three times faster, dispensing medication in less than a minute. The new machine has the capacity for more than 2,000 different medications.

EVERYDAY TALES OF TRAUMA

A young woman who lost half her blood in a terrifying car crash, and lived. A man with a fractured skull from a simple fall on his stairs. A crack team of nurses, surgeons and specialists on call 24/7. Welcome to the daily drama of the region's trauma HQ

by Hannah Hoag | photography by Doug Nicholson

Everyone says 24-year-old Santanna Marrocco is lucky to be alive.

It was late on a Thursday afternoon in early December last year. Santanna and her mother-in-law had just finished installing a set of holiday flower arrangements at a client's house in King Township, near Nobleton, Ont. The pair planned to fit in one more client visit before Santanna met her husband Dan for a dinner date.

As they turned out of the driveway, their truck collided with another car. Though both vehicles were badly damaged, no one was seriously injured. While Santanna waited for the police to turn up, Santanna's husband and her father-in-law arrived.

About 40 minutes later, without warning, another car cleared the corner, slid on the ice and spun. It was followed by a black truck that swerved to avoid the car. It too struck the ice, hit Santanna and tossed her through the air. The truck then ran over her and dragged Santanna about four metres before it came to rest, with her buried in the snow under its rear wheels.

"The last thing I remember is being underneath the truck and having Dan dig me out. He was crying and freaking out. I said, 'I love you, and 'goodbye'," recalls Santanna. "I didn't think I was going to make it."

Santanna owes her survival to a set of coincidences, some quick thinking by an off-duty emergency physician and a first-rate trauma team at Sunnybrook.

The crash took place not far from the home of a pair of Sunnybrook doctors. Dr. Valerie Krym was outside, cleaning snow off the steps of their house when her husband telephoned. He is the Medical Director at ORNGE, the transport medical service provider for the province of Ontario, and was on duty in ORNGE's Communication Centre that evening. He'd heard about the crash and called home to check on his wife.

By now it was dark. The ORNGE helicopter did not land at the scene because these landings are not safe to do at night, and there wasn't a nearby helipad or airport available. A land ambulance was dispatched and already en route to the scene.

Dr. Krym, an emergency physician at Sunnybrook, walked to the end of her long driveway. The crash scene was a kilometre away and Dr. Krym's car was in the shop, but because there were so many emergency vehicles on the scene she decided to walk there.

When Dr. Krym arrived, she saw that Santanna was critically injured—her pelvis and lower legs were crushed and one of the major blood vessels in one of her legs had opened up. Her blood pressure was very low. Sunnybrook was not the closest hospital, but "I knew it was her only chance of survival. She needed a trauma centre," recalls Dr. Krym. "While we were speeding down the 401, I told the driver to notify Sunnybrook's trauma team and tell them to be ready and waiting for us in the trauma room for our arrival."

Santanna's injuries were so severe, the health care team didn't think she would live. "The injuries were clearly horrific and life threatening. She'd lost more than half her blood," says Dr. Doreen Yee, the trauma team leader who directed Santanna's care that night.

DID YOU KNOW?

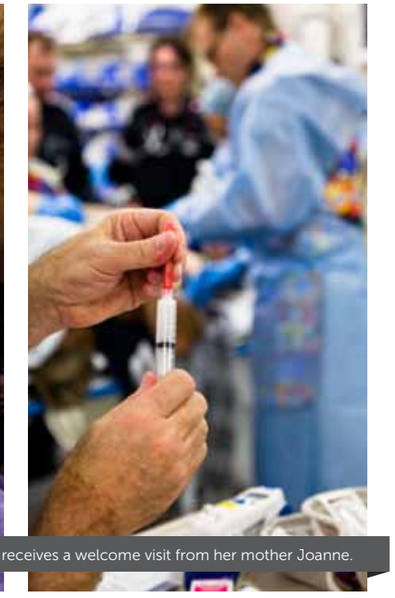
Of the 1,042 trauma patients treated at Sunnybrook in 2010, nearly half of them were involved in motor vehicle collisions.

Sunnybrook's Tory Regional Trauma Centre provides care for patients suffering from a wide range of traumatic injury from motor vehicle collisions, stabbings and gunshot wounds, cycling and other recreational activities, and falls in the GTA and south central Ontario.

When Sunnybrook receives notice that a trauma is en route, it activates an internal network that draws the on-call trauma team composed of anaesthesiologists, orthopaedic surgeons, general surgeons, neurosurgeons, respiratory therapists and nurses to the trauma centre.

On a Monday afternoon in late February, Heather Mazurenko, a registered nurse, picks up the receiver of the red phone on the nurses' desk in the emergency department. "How far out are they?" she asks the dispatcher. A screen mounted on a nearby wall has begun to flash. An older man has fallen down the stairs at his home and hit his head. EMS has scored the injury a level 2 out of 5 on the Canadian Triage and Acuity Scale, where 1 is the most severe.

"It's coded as a trauma, so they'll come to the nearest trauma centre, which is us. We'll treat it as such until we know what's going on," says Ms. Mazurenko,



Left: Heather Mazurenko, RN, monitors incoming patients on the red phone. Centre: Santanna Marrocco receives a welcome visit from her mother Joanne.

Heather Mazurenko, RN, picks up the receiver of the red phone on the nurses' desk in the emergency department. "How far out are they?" she asks the dispatcher. A screen mounted on a nearby wall has begun to flash.

taking off her glasses. It's just after 5 p.m. and nearly 10 hours into her shift. As the scheduled Clinical Care Leader, Ms. Mazurenko's role is to manage the movement of patients through the hospital's emergency department and its health care staff. "I need to know where everyone is and what beds are available. I run around all day—I'm the rabbit. That's why I have lunch at 7 p.m.," she says. When the ambulance is on its way to Sunnybrook she pages the trauma surgical team. Most traumas will reel in seven staff; a major trauma will draw in closer to 10.

At 5:40 p.m. four paramedics wheel the patient stretcher into the trauma room, a large open space with four trauma bays. Metal storage racks stacked with blue boxes stocked with syringes, gloves and other medical supplies line one wall. A low fridge tucked against the opposite wall holds blood. A Kodak Direct View DR 95000 system X-ray machine is suspended from the ceiling.

The man is intubated, hooked up to an intravenous line, sedated and attached to a portable monitor that measures his heart rate, blood pressure and blood oxygen levels. Dr. Paul Engels, the on-call trauma team leader, leans over the table and rubs his knuckles into the centre of the man's chest.

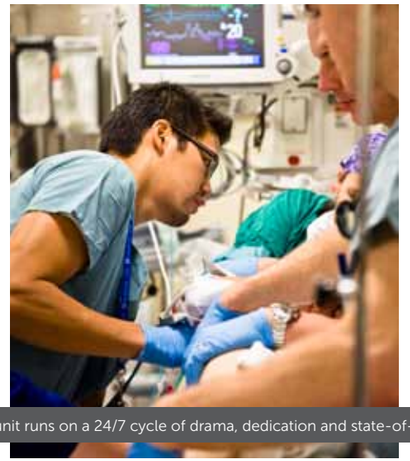
At the scene of the crash, the man had scored an 11 on the Glasgow Coma Scale, which assesses a patient's eye, verbal and motor responses following a head injury. The pain response was a good sign, but the patient's score had dropped to a five, and considered severe. "Pupils are 2, and reactive bilaterally," says Dr. Engels.

Dr. Sebastian Tomescu, the on-call orthopaedic resident, runs his hands along the man's legs and flexes his knees and rotates each hip, checking for broken and dislocated bones. He moves quickly, finding no injuries.

The team of seven rolls the man onto his side so that Dr. Tomescu can check his spine. Amidst the chatter, the beeps and the pings, there are the sounds of the patient's flannel shirt ripping and metal hitting the floor as his belt and pants are dropped. Discarded packaging and medical tape accumulate around the stretcher. A kidney-shaped tray holds the patient's dentures. They remove the neck brace, staple shut the laceration over the man's right ear, and roll him back. "Let's do a chest and a pelvis X-ray," says Dr. Engels. It's 5:59 p.m.

Less than 10 minutes later, the room is noticeably calmer and quieter. The trauma team continues to check the patient's vitals noting the numbers in his chart, and tidy up the tubes and wires that connect him to the IV bags and machines, before he is wheeled a short distance down the hall to the trauma centre's dedicated CT scanning room.

Ten staff lift the man from the stretcher to the narrow CT table to scan for bleeds and breaks. Dr. Martin Shoichet, a radiologist, spreads his elbows wide and leans on the desk peering at the computer screen in front of him. He spots a crescent-shaped sliver of blood between the brain and the



The trauma unit runs on a 24/7 cycle of drama, dedication and state-of-the-art care

skull. "There's also a rib fracture, and probably a small hemothorax [blood in the chest cavity], maybe two," says Dr. Shoichet. Dr. Engels picks up the phone and books an operating room.

"He hit his head pretty hard if he has a fractured skull," says Dr. Shoichet.

Ginny Cosby, a registered nurse on the trauma team, pops into the room to speak to Dr. Engels. "I've told the family he's critical and that you'll come to see them. I put them in the family room. They're a little anxious," she says.

A minute later, Ms. Mazurenko leans into the room, phone tucked under her ear. "I've got an OR," she says. The trauma team stops the scan and moves the patient onto the elevator to take him up to an operating room. It's 6:51 p.m.

Back at the nursing station in the Emergency Department, staff dressed in jackets and carrying coffee begin streaming in and study a large white board to find their assignment for the night. There are two minutes left in Ms. Mazurenko's shift and she has yet to eat her lunch. The red phone rings. She picks it up. "Tell me, what's on the ticket?" she asks.

Santanna's heart stopped while she was in the CT scanner. "When people's hearts stop because of blood loss, it is not easy to get them back," says Dr. Yee. The team did CPR and gave Santanna epinephrine to keep her alive and rush her up to the OR. "I had an excellent trauma team that night, we were a well-oiled machine," she says. "Dr. Krym made a good decision to bring Santanna to Sunnybrook and not waste time going to one of the smaller hospitals that might not have had the resources to help her," says Dr. Yee.

Santanna's pelvis was crushed. The doctors amputated her left leg above the knee and performed a through-the-knee amputation on her right leg. But she is alive. Three months after the accident, Santanna remains in a rehabilitation hospital receiving occupational and physical therapy daily. "My goal is to get my prosthetic legs, so I can get back on my horses. I miss my animals so much," she says. Santanna's other goal is to have a helipad built in the Nobleton region so that other trauma victims don't face the same risks she did. "If it wasn't for Dr. Krym, I wouldn't be here," says Santanna.

when every second counts: THE NEW HELIPAD

The Trauma, Emergency & Critical Care program treats about 54,000 patients each year, more than double any other hospital in Ontario. About 1,200 of those will be suffering life-threatening traumas, half of whom will arrive in a helicopter.

Right now, the hospital's helipad is located about half a kilometer away from the trauma room. Paramedics and trauma staff have to coordinate with a land ambulance to transfer patients from the helipad to the trauma room. This adds about 10 minutes to treating a medical crisis where every second counts.

"We're already very good at saving the lives of trauma patients - now we're focusing on incremental growth to further improve care. A new helipad on the roof of the hospital would give patients direct access to our trauma services in the shortest time," says Dr. Homer Tien, medical director of Sunnybrook's Tory Regional Trauma Centre.

The plan is to build a state-of-the-art helipad on top of the hospital. Once in service, patients will be transferred from the roof to the trauma room via an elevator, giving our trauma teams more time to save lives.

The project will cost $6 million and will be entirely funded by donors. So far, Sunnybrook Foundation has raised $3 million toward that goal.

If you're interested in helping to fund the construction of the helipad, visit sunnybrook.ca/helipad.

SUPERBUGS BE GONE

Resistance is futile – or at least that's the future goal of a Sunnybrook team working to fend off drug-resistant bacteria by cutting down on the use of antibiotics

Sunnybrook's test program to place closer monitoring on the delivery of antibiotics is already showing benefits.

It happens in every hospital: a critically-ill patient develops an infection. One example is ventilator-associated pneumonia, a common and serious infection in critical-care patients.

Not knowing which bug is causing the infection, the attending physician starts the patient on one or two or possibly even three broad-spectrum antibiotics, medications that are most likely to cover any potential culprits.

The patient's samples are sent to the lab. Two days later, the results come back and the bacteria responsible for the infection are identified. Now – in the interests of reducing antibiotic resistance – it may be time to switch the patient to a narrower, more exact antibiotic to target the specific bug.

"We want a drug that is active against that one bug. We don't want to use a sledgehammer when a nail file will do the job," says Dr. Andrew Simor, head of the department of microbiology at Sunnybrook and a senior scientist at the Sunnybrook Research Institute.

Sunnybrook has been a leader in making sure antibiotics are used efficiently and with precision, a practice that helps control antibiotic resistance. And an exciting new initiative is improving antibiotic prescribing even more.

The Antimicrobial Stewardship Program began as a pilot study in Sunnybrook's critical care unit in 2009. The unit was a good place to start, since that is where patients are sickest and potentially exposed to the most procedures, devices and infections.

Antibiotic resistance has increased over the last many years in society and in hospitals, explains Dr. Simor. One of the drivers of this increase is excessive use of antibiotics, also known as antimicrobials.

To steward antibiotic use requires a collaborative effort. The lead investigators for the initiative were Dr. Simor, along with infectious-disease physician Dr. Nick Daneman, pharmacy and infectious-disease expert Dr. Sandra Walker and infectious disease pharmacist Marion Elligsen.

Here's how the stewardship program works: When a patient receives antibiotic treatment, the pharmacy is notified. On day three the team reflects on whether the patient is receiving the appropriate antibiotics. "By then," says Dr. Simor, "we have received labs and cultures, and have much more information on how the patient is doing."

The infectious-disease pharmacist reviews the situation. Is there an infection? What germ is responsible? Is the patient still critically ill? Are there side effects? How is his or her kidney function? Is the dosage and frequency correct? Should we switch from intravenous to oral? Are there any allergies that might affect the choice of medication?

"Based on that review," says Dr. Simor, "the pharmacist may decide that is still the best drug. Or they may say, we know this organism can be easily treated with a narrower-spectrum antibiotic. We don't need the big guns."

Having made this decision, the pharmacist then reviews the case with the infectious disease physician, who may agree or disagree. They then communicate their recommendation to the physician who is attending to the patient, known as the critical care doctor. "We are only making suggestions," says Dr. Simor. "The critical care doctors should be the final arbiters; in our study, we found they complied with our suggestions 90 per cent of the time. We had excellent cooperation and buy-in."

The program has thus reduced antibiotic use by more than 20 per cent and quelled some resistant bacteria in the Sunnybrook Critical Care Unit. "We have demonstrated significant overall reduction in utilization and reduction in broad spectrum antibiotic use, which has resulted in a decrease in drug costs," says Dr. Simor. "And, even more significantly, there is some evidence of a decrease in the markers of antibiotic resistance and a decrease in C. difficile, compared to other parts of the hospital where rates stayed the same."

Dr. Simor and his team also studied whether tighter control over antibiotics had any undue effects on patients. "Did we affect the length of stay or in-hospital mortality? We studied that and believe the answer is no.

"We don't believe we did any harm and we do believe we have done some good. We have been able to show with scientific elegance that it does make a difference. I've been delighted at our success."

Sunnybrook's Antimicrobial Stewardship Program was such a successful collaboration that in the fall of 2010, it received funding to be not only continued, but expanded into other departments in the hospital.

BACTERIA: smarter than us?

Why do antibiotics stop working against certain bacteria?

Bacteria evolve quickly to survive – faster than humans can create new antibiotics. "Bugs are much smarter than we are. They have been around for millions of years, whereas antibiotics have only been around for about 60 years," says Dr. Simor.

Bacteria have three ways to outfox antibiotics: by producing enzymes that change or destroy an antibiotic, by changing their basic structure so that an antibiotic is no longer effective, or by developing an outer shield against the antibiotic. "Every time we develop a new antibiotic, sooner or later some bug will develop resistance," says Dr. Simor.

Broad-spectrum antibiotics, such as the newer cephalosporins and fluoroquinolones, are capable of attacking many different types of bacteria. "In general, the more broad spectrum the antibiotic, the more likely they are to cause resistance," says Dr. Simor. Ideally, doctors prescribe more narrow-spectrum antibiotics to target the exact bacterium, such as penicillin, amoxicillin or a sulfa drug.

Once a "superbug" becomes highly resistant, doctors have to try different antibiotics until they find one that works. "It may add up to a germ being no longer treatable. These are still few and far between, but that's the danger," says Dr. Simor.

Some of the nastiest antibiotic-resistant organisms:

- Methicillin-resistant Staphylococcus aureus (MRSA), which causes skin and soft tissue infections, pneumonia and bloodstream infections.
- Vancomycin-resistant Enterococcus (VRE), a bug that lives in the bowel.
- *Clostridium difficile* (C. difficile), which causes diarrhea.
- Pseudomonas aeruginosa, an infection that is resistant to many antibiotics, such as quinolones and carbapenems. Hits the bladder, lungs and blood, and occurs most often in hospital.
- Multidrug-resistant Acinetobacter baumannii, which can cause pneumonia and infections in the urinary tract.
- New Delhi metallo-beta-lactamase (NDM-1)-producing E. coli. Resistant to almost every available antibiotic.

THE NUMBERS DON'T LIE

When it comes to screening for prostate cancer, the standard PSA test is good, but not enough. Enter Dr. Robert Nam with a risk-calculation tool that takes detection to a new level

The day before Barry Shiffman was to fly from Toronto to Russia to begin serving on the Violin Jury of the International Tchaikovsky Competition, the 44-year-old learned he had prostate cancer.

"I was floored by the diagnosis. I sat for in the lobby of Sunnybrook for two-and-a-half hours thinking, 'What is happening?'" recalls Barry, who is the associate dean of the Glenn Gould School at the Royal Conservatory of Music, and father of two. "But once you get over the insanity, the realization, that you have cancer, then you think, 'I am so lucky. It could have easily been missed'," he says.

When Barry moved with his family to Toronto from Banff, Alberta in 2010, he thought he had his health under control. He had been previously diagnosed with a benign enlarged prostate, the harmless growth of the prostate often associated with aging. As a precaution, Barry had his PSA levels checked routinely, to rule out the possibility of prostate cancer.

The adult prostate gland makes a protein called prostate specific antigen (PSA). A healthy prostate releases small amounts of the protein into the blood, but prostate cancer will often increase its production. Men with PSA levels greater than 4 nanograms per millilitre of blood may be offered a needle biopsy to check the prostate for cancer.

In December, Barry's PSA test came back higher than normal. His physician consulted with Sunnybrook's Dr. Robert Nam, a urologic oncologist at the Odette Cancer Centre, and researcher behind a new online tool that provides a better assessment of prostate cancer risk. It helps patients avoid unnecessary prostate biopsies, but it can also detect prostate cancer at an earlier, more curable stage, and identify high-risk patients.

Dr. Nam developed the risk calculator when he realized that the PSA blood tests doctors use to screen for prostate cancer were no longer reliable. "When it was introduced 20 years ago it was a fabulous test. It caught all the cancers out there. But it couldn't detect the low volume prostate cancers—the new cases that were just starting out and didn't have enough cancer cells to crank up that PSA. But then we realized that we knew a lot about the established risk factors for prostate cancer," Dr. Nam says.

Unlike the standard approach, the new calculator (also called a nomogram) considers age, ethnicity, family history of prostate cancer and urinary symptoms when calculating a man's prostate cancer risk. Dr. Nam and his colleagues developed and checked the risk calculator with over 3,100 Canadian men, including 408 men with normal PSA levels. It worked better than conventional screening methods. Nearly a quarter of the men with a normal PSA were diagnosed with prostate cancer.

The prostate cancer risk calculator is designed to help detect the disease in men such as Barry Shiffman.

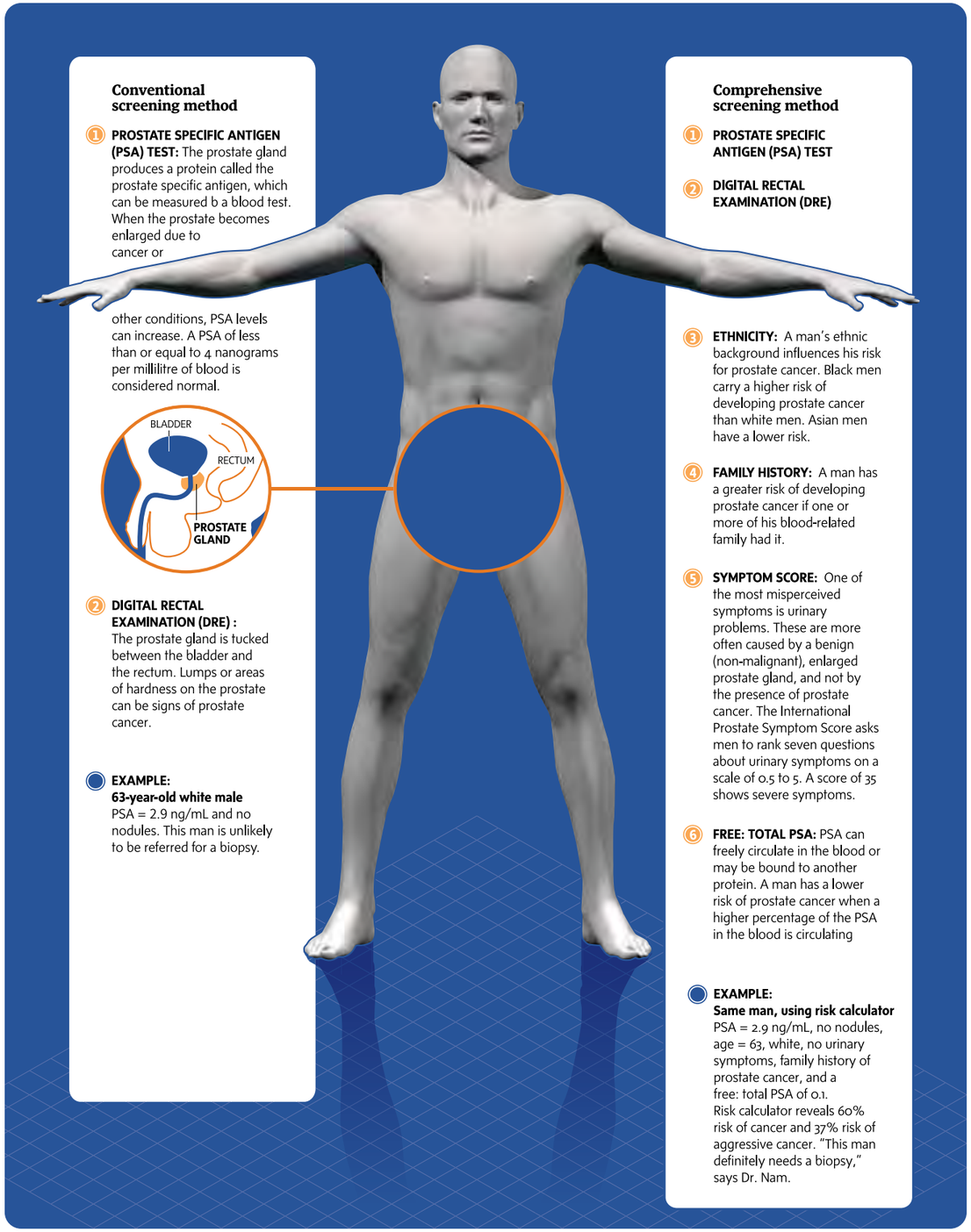
"The calculator empowers the patient. They still control what they want to do, but it gives them more information to make their decision," says Dr. Nam. "That's the bottom line."

"I haven't cancelled my plans for the summer," says Barry. "My treatment plan doesn't include chemo or radiation, but I will have surgery in April. Hopefully I'll be back to life as I know it soon."

RAPID DIAGNOSIS: A Canadian First

Sunnybrook's Odette Cancer Centre recently launched a new clinic for rapid results on prostate biopsies. Now offering results in 72 hours versus the standard two to three weeks, this is a Canadian first with results that are more accurate than conventional testing. Men will know sooner and more accurately. This is particularly critical if they are diagnosed with an aggressive form of the cancer. Once results are back in 72 hours, if positive, treatment plans are immediately evaluated.

HOW THE RISK CALCULATOR SPOTS TROUBLE THAT CONVENTIONAL SCREENING MIGHT MISS



A STENT IN TIME SAVES MARGO

Chest aneurysms are highly dangerous, and the open surgery to repair them just as risky. But a much less invasive technique is producing amazing results

Margo Balanyi is a vibrant Toronto senior who recently celebrated her 86th birthday at a Chinese restaurant with friends and family. No one would have suspected that a few weeks before, she had a ticking time bomb in her chest—a thoracic aortic aneurysm— requiring a life-saving operation.

But her recovery from a relatively new and minimally invasive surgery called endovascular aneurysm repair (EVAR) was so rapid that by the party, "she looked like a million bucks," says her daughter, Dr. Sue Belo.

Things could have turned out very differently. In December, Margo's family doctor ordered a routine chest X-ray. "She had no symptoms at all at that time," says Dr. Belo. But fortunately, the doctor discovered an aortic aneurysm (a bulging of the main blood vessel that carries blood from the heart to the rest of the body) in her chest. Aortic aneurysms are most commonly found in the abdomen, but can also develop in the chest or other portions of the aorta.

Luckily for Margo, her daughter Sue is an anesthesiologist at Sunnybrook who works with Dr. Giuseppe Papia, a vascular and endovascular surgeon at the Schulich Heart Centre.

"I asked him what we should do," says Dr. Belo. "And he suggested we make an appointment for my mother to be assessed in the Vascular Clinic. At which point I was very reluctant—the treatment for this is the open repair… it's a huge surgery, particularly at the age of 85," Sue says. Still, she was hopeful her mother would be a candidate for the less invasive EVAR procedure.

At Sunnybrook, Dr. Papia discovered that the aneurysm was 9cm — extremely large. "Usually in the chest we fix them when they get to 6.5 cm because that's a very high chance of rupturing. [Nine] is a big deal." If an aneurysm ruptures, the mortality rate is 85 percent.

By this point, Dr. Belo's mother was nervous. "[I was] very scared. I thought this was the end of my old age," Margo, whose first language is Hungarian, said through her daughter.

Open surgery—still the most common way to fix aortic aneurysms—requires making a large incision in the belly and replacing the ballooning part of the aorta with a graft. But such a massive operation is risky for the elderly or those who have cardiac or respiratory problems because it can cause bleeding, heart attack, kidney failure, infection and death.

Margo Balanyi, 86, had an aortic aneurysm that could have been fatal.

Fortunately, doctors at Sunnybrook found that Margo was a good candidate for EVAR.

She underwent the hour-long procedure last Dec. 6, during which the doctors used wires threaded through her femoral arteries to put a stent graft in her aorta so that blood that was flowing into the aneurysm would now flow through the stent.

She was released from the hospital within two days. Her daughter was ecstatic.

"This is amazing. I couldn't believe what a phenomenal response this is … to go home post-op on day two. In this age group!" says Dr. Belo.

Sunnybrook introduced this surgery in 2006. At that time, it was considered experimental and was not funded by the government. Until 2009, when the procedure became government-funded, all EVAR procedures at Sunnybrook were paid for by donors, over $3 million worth.

"I can't really think in the last decade what bigger impact there has been in medicine than endovascular stents. This is one of the situations where the treatment was almost as bad as the disease," says Dr. Papia.

EVAR surgery has improved mortality rates for those who can't handle open surgery, says Dr. Andrew Dueck, a Sunnybrook vascular surgeon who conducted Margo's operation with Dr. Papia. In abdominal aneurysms, the EVAR mortality rate is around two per cent, compared with four for open operations; in the chest area, it is less than 10 per cent, compared with up to 25 per cent for open surgeries, he says.

Both physicians agree that while improved mortality rates are a positive outcome of EVAR, a much quicker recovery time is also a large benefit. Typical open surgery means a seven or eight hour operation and six weeks' to three months' recovery, while EVAR surgery takes an hour or two and patients are out of the hospital within days.

"As a surgeon who does it both ways, it really is a staggering difference. When you think you have accomplished the same thing, and two days after the operation the patients' biggest problem is they don't like the coffee," says Dr. Dueck.

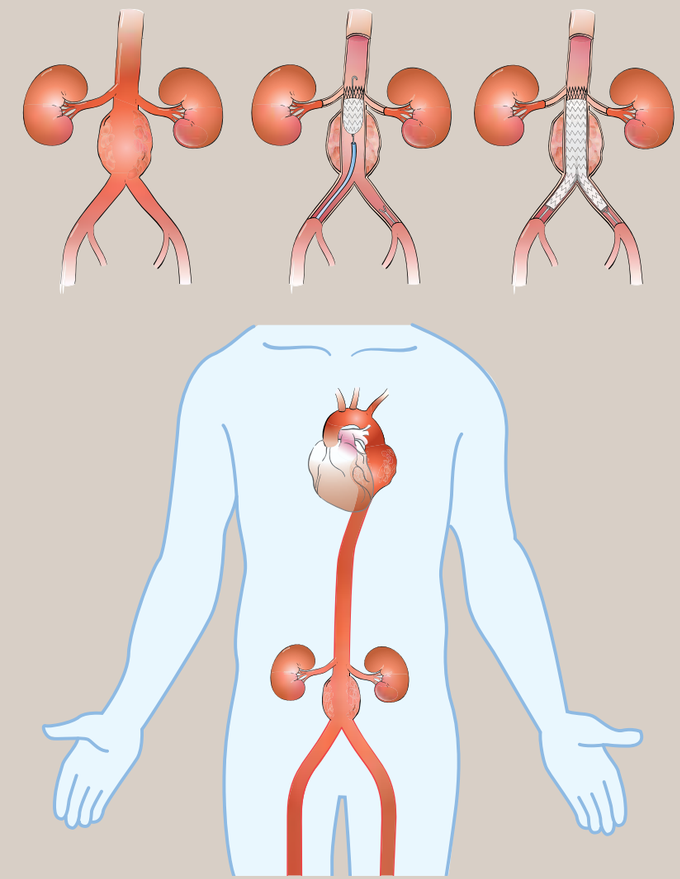
Although EVAR is costly, (stents are $10,000 to $15,000) the results — patients who survive and continue their normal activities as usual —aren't measurable, say Drs. Papia and Dueck.

Wayne Yorke, 68, of Newmarket, Ont., another patient of Dr. Papia's who had EVAR surgery a year ago, says it's made a huge difference. "The day after, I was up walking the halls." His procedure went so well, he was even able to return to work within two weeks.

Margo has been able to get back to spending time at her Hungarian club and seeing friends and family. "I am stronger and I have more energy … I go to the hairdresser and have my nails done."

EVAR: HOW DOES IT WORK?

This is how the procedure is performed for an abdominal aneurysm



Small incisions are made in the groin to access the femoral (thigh) artery

A guide wire is inserted into the femoral artery until it reaches beyond the aneurysm in the aorta

An X-ray or angiogram using a dye to take images of the blood flow in the artery help guide the wires into place

A stent graft, a tubular device made of fabric supported by metal, is fed along the wires to the site of the aneurysm

Doctors use the imaging to decide exactly where to deploy the device

The stent graft is placed across the aneurysm and keeps the aorta open. The blood flows through the stent graft rather than the aneurysm, which depressurizes it and prevents it from rupture

THE ALL-CLEAR

Pioneered by a Sunnybrook specialist, a new treatment that unclogs blocked arteries is giving new life to cardiac patients

John Balkwill: 'It's like a new life now, a totally new life.'

John Balkwill sees piles of snow when he looks out the window. But even though spring is still a few weeks away, he's already planning a reunion with his golf clubs.

"I haven't played golf for close to two years," says John, a resident of Leamington, Ont., who was referred to Sunnybrook last year after an angioplasty procedure – one of many he has had over the last decade – failed to unclog the arteries to his heart. "In fact, I haven't been able to do much of anything for the last two years since I lived in pain every day and had been mostly bedridden."

Yet today, John is back to doing most of the things he used to do before heart disease disrupted his life. He's gone back to work at the business he co-owns, a company that provides electronic controls for greenhouses. He's exercising. He's got a life again – all because of a small dose of an enzyme called collagenase.

Last November, John became part of a clinical trial at Sunnybrook that saw collagenase – a fluid commonly used in laboratories to prepare cell cultures – injected via catheter into the blocked arteries of 20 patients.

Collagen is the primary component in the plaque that builds up and blocks the arteries of people with coronary heart disease. During an angioplasty, doctors try to push a guidewire through the plaque to make way for a catheter with a small balloon on its end.

Once the catheter is positioned properly, the balloon is inflated, causing it to press against the walls of the artery and creating blood flow. But in certain patients – like John – the plaque is so hard the guidewire can't penetrate it at all. This is a life-threatening situation.

Collagenase works by softening the collagen in this rigid plaque, causing it to degrade and break down.

"Collagenase enzymes are very specific in that they target collagen and break down its structure," explains Dr. Bradley Strauss, chief of the Schulich Heart Centre at Sunnybrook and leader of the collagenase trial.

Dr. Strauss, who is also the Reichmann Chair of Cardiovascular Sciences, has been experimenting with this application of collagenase since the 1990s. In addition to proving the enzymes are effective in softening plaque in coronary arteries, he has also produced a grade of collagenase safe for use in humans.

> *"I never gave up on collagenase because I always felt that it made sense."*
>
> Dr. Bradley Strauss
> Schulich Heart Centre

In 2008, Health Canada gave him the go-ahead to do his first patient trial. The day after John received his dose of collagenase, he was back in the operating room at Sunnybrook for an angioplasty. This time, the guidewire and catheter made it through easily.

"For the last two years I could not take two steps without having angina pain, and I was basically on medication all the time to help me cope with the pain," says John. "Now two days a week I'm working out for an hour-and-a-half each day, running on the treadmill, doing bike work, lifting weights.

"I can basically do anything I want. It's like a new life now, a totally new life."

John isn't the only success story to emerge from the collagenase patient trial. Next-day angioplasties on 13 of the first 15 patients – Dr. Strauss is still finalizing his findings on the other five patients – were successful, with the plaque softening enough to let the guidewire through.

Mohsen Ghatavi is another one of these success stories. After a year of sporadic chest pains – one episode happened while he was on the highway driving to work – Mohsen is pleased to report that he is now pain- and worry-free.

"I feel great and I want to thank Dr. Strauss and his nurses and research team for what they have done," he says. "I hope they can treat more people."

That's exactly what Dr. Strauss and the people at Sunnybrook are hoping for, too. Making collagenase available to more people, says Dr. Strauss, would reduce the need for bypass heart surgery and improve the quality of lives of people living with heart disease.

"All of the patients in the trial had previously had failed angioplasties," he says. "Without collagenase, the only recourse for some of them might be bypass surgery, while those who aren't good bypass candidates would be put on medication and would have significant limitations to their lives."

The years leading up to the patient trial were not always easy, says Dr. Strauss. There were many times when he was stuck on a problem, unsure about how to go forward.

"But I never gave up on collagenase because I always felt that it made sense," he says. "So to see it work on patients and to know that we've been able to make a difference in these people's lives – well, it's just amazing."

Dr. Bradley Strauss (top) has pioneered the use of collagenase to unblock arteries.

MARIO'S HEARTFELT SONG

Jazzman and real estate businessman Mario Romano reveals why Sunnybrook's 'beautiful people' struck a chord with him

Businessman, jazz pianist and generous Sunnybrook donor, Mario Romano.

Every time Mario Romano puts his fingers on the keyboard, he's reaching for more than music. "It's the hope, as you're getting into the piano, getting into the music, starting to improvise. It's reaching for that moment of divinity that happens once in a blue moon. Where you fall into a space, you fall into a world of just sheer beauty."

It's a search he gave up for 30 years all because of a Steinway piano.

He was playing the jazz clubs in Toronto in the mid-'70s, after studying jazz composition and performance at Humber College and York University and classical at the Royal Conservatory. "My dream was to just buy a Steinway piano," he says in an interview from his office in Markham, Ont. Problem was, he couldn't afford it. A friend had a sure thing in real estate development, so Mario borrowed $6,000 from his father to invest. But the sure thing was, he recalls, "a lemon."

"I could not face my father and tell him." Frantic to salvage the deal, Mario went to the mayor of the municipality where the land was and learned what he needed to make it work. He pulled it off and got enough back to pay his father, buy his piano and head to New York's jazz scene. When he returned to Toronto a couple of months later, broke, he knew what he needed to do: "I dropped music." Real estate became his world.

To say he was successful would be a serious understatement. He now is president and founder of the Castlepoint Group of real estate development companies and a dedicated philanthropist who counts Sunnybrook as one of his causes.

His commitment to Sunnybrook came several years ago, after he had a stent implanted to unblock an artery. "I loved how they treated me ... and I saw that they do great, great, great work." Then, he says, he realized he knew some of the board members and started meeting the doctors "and they're all beautiful people."

Naturally, he says, "when you bring

"When you bring people together in a situation where someone's taking care of you, in a situation of need, by its very essence you create communion."

Mario Romano

people together in a situation where someone's taking care of you, in a situation of need, by its very essence you create communion." It's like if you're hungry and someone feeds you, "you go back and visit them, you bring an apple pie, you bring something."

He knows the health care system is under stress and Mario feels a strong need to give back to the people who take care of him. A donor to the Schulich Heart Centre, Mario arranges to meet with someone from Sunnybrook Foundation every time he has an appointment at the hospital.

Mario, who was born in Buenos Aires in 1951, poured his substantial energy and jazz-born creativity into his businesses until 2008, when the deaths of his father, Modesto, and, several weeks later, his mother, Filomena, put him back on the musical track.

"Death," he explains, "causes fundamental dialogues." His father worked in construction, but music was his passion and the harmonica his expression. There was "every instrument you could think of" at home and Mario and his three siblings all learned to play. Mario's instrument was the accordion – "I still play it once in awhile" – but piano took over after his father brought home a used one when Mario was in his late teens.

His father was never happy that Mario had swapped music for real estate. "He always loved me in music, never much cared for me in business," he says. "... One of the last things he did was play the harmonica and tell me he always told me 'play music.' "

So, three decades after walking away from his hard-won Steinway, Mario took his father's advice to "follow your heart," and started practising again. He put a band together and began writing and arranging music. They started performing in the Toronto area and did a tour in Italy last summer. Then, in the fall, the Mario Romano Quartet released a CD, Valentina, named for the youngest of his four children. He's working on another album and planning an Italian tour in August.

Mario now owns 10 pianos, including a Fazioli grand, but still has his first Steinway and plays it regularly. In fact, "it's my favourite."

So what inspires him to play? "It becomes a form of prayer," he says. "... It's a language that has no definition but yet encompasses ... all truth in the universe."

THANK YOU FOR A LIFE SAVED

We receive thousands of letters each year from patients and their loved ones who have been touched by the care they received. Here is one that, in turn, particularly touched us.

Lenore Wirth was working alone in a clothing store in July 2009 when, at random, she was brutally attacked by a man and left for dead. She was airlifted to Sunnybrook, admitted for two weeks, and returned for two follow up surgeries.

On July 11, 2009, I was airlifted to Sunnybrook after being brutally attacked, strangled and stabbed over 31 times and left for dead.

I received the most incredible care from the surgeons and nurses during my stay and although I thanked them personally, I wanted to contact Sunnybrook with my survival story and let you all know how much this hospital means to me and my family.

I am so grateful for living in a city that has such a fantastic trauma centre. It has been a year and a half later and I have been back for two further surgeries to aid in the repair of my hand.

Each time I have received wonderful care and support from the staff at Sunnybrook.

Thank you very much,

Lenore Wirth