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innovator

Local Research, Global Impact.



Local Research, Global Impact.



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As

a leading academic health sciences centre, St. Joseph's Healthcare Hamilton is committed to advancing health care by pushing the barriers of modern medicine through innovative research and ground-breaking discoveries. Translating our research into improved health care practices and ultimately, better patient care is what we strive for both in our daily work, and as a central pillar in our Strategic Plan.

Our vision is to deliver an integrated, high quality care experience to those we are privileged to serve. Pursuing knowledge is a key driver in our ability to deliver on this vision – but equally important is our ability to share and translate that knowledge to others so that we are advancing health and well-being beyond the walls of our hospital – and in fact beyond the borders of our city and province.

The breadth and scope of research conducted at St. Joseph's has global impact, changing medical practices across the world. Such world-renowned work includes the introduction of the AeroChamber, one of the

world's most commonly used inhaler devices for asthma, to the development and validation of new sensitive diagnostic tests for SARS. It has only been through the diligence and dedication of our researchers and support from our community that we have been able to bring forth such medical advances. These efforts and impacts on quality health care and scientific research programs have also been recognized on a national level through our recent recognition as one of the Top 40 Research Hospitals in Canada.

Innovator is our way of celebrating the achievements of the remarkable men and women who pioneer these significant advancements. Their work – whether it is pioneering unconventional treatments for *C. difficile*, changing the way we treat internal blood clotting or using cognitive behavioural therapy to alleviate menopausal symptoms – has a meaningful impact on the lives and health of patients, not only in our own backyard – but across the world.

We hope you enjoy their stories.

A word from Dr. Kevin Smith



As one of the country's largest health care systems, St. Joseph's Health System was established to meet the challenges of a rapidly changing environment for the delivery of health and social services. That mandate, though established decades ago, remains relevant today and is evidenced daily in the innovation and research happening at St. Joseph's Healthcare Hamilton (SJHH).

Driven by a vision to deliver an integrated, high quality care experience and a passion for the pursuit and sharing of knowledge, researchers at St. Joseph's are driving scientific and medical breakthroughs that are improving the lives and

health of patients both in our own backyard, and around the world. We are fortunate to work in full partnership with McMaster University's world renowned Faculty of Health Sciences in our pursuit of this knowledge.

With a spirit of enquiry, our dedicated scientists are challenging traditional models of thinking to bring innovation to life. This issue of Innovator is a tribute to their passionate pursuit of new knowledge, and recognition of the transformative impact their research delivers.

PRESIDENT AND C.E.O.
St. Joseph's Health System

A word from Dr. David Higgins



As an academic health sciences centre, it is vitally important that we deliver high quality, compassionate care to the community we serve. It is equally important that we demonstrate leadership in developing new knowledge, design ways to implement that new knowledge effectively, and develop and inspire those who will be the researchers of the future.

Like the excellent care they expect from St. Joseph's, our patients regard research as a key element of our programs and something they value strongly. Research offers hope to others through discovery and the acquisition of new knowledge.

We are grateful to, and proud of, the talented researchers we have helped inspire, who have in turn inspired us and who have returned to their home to carry on the work begun at our hospital.

The stories you will read and the individuals you will meet in this issue of Innovator bring to life the inspiring work taking place at St. Joe's – they demonstrate the importance of local research in breaking down barriers to achieve improved health outcomes not only within our community, but on a national and global scale. I welcome you to join us in our journey of research and innovation.

A handwritten signature in blue ink that reads "David Higgins". The signature is stylized and fluid.

PRESIDENT

St. Joseph's Healthcare Hamilton



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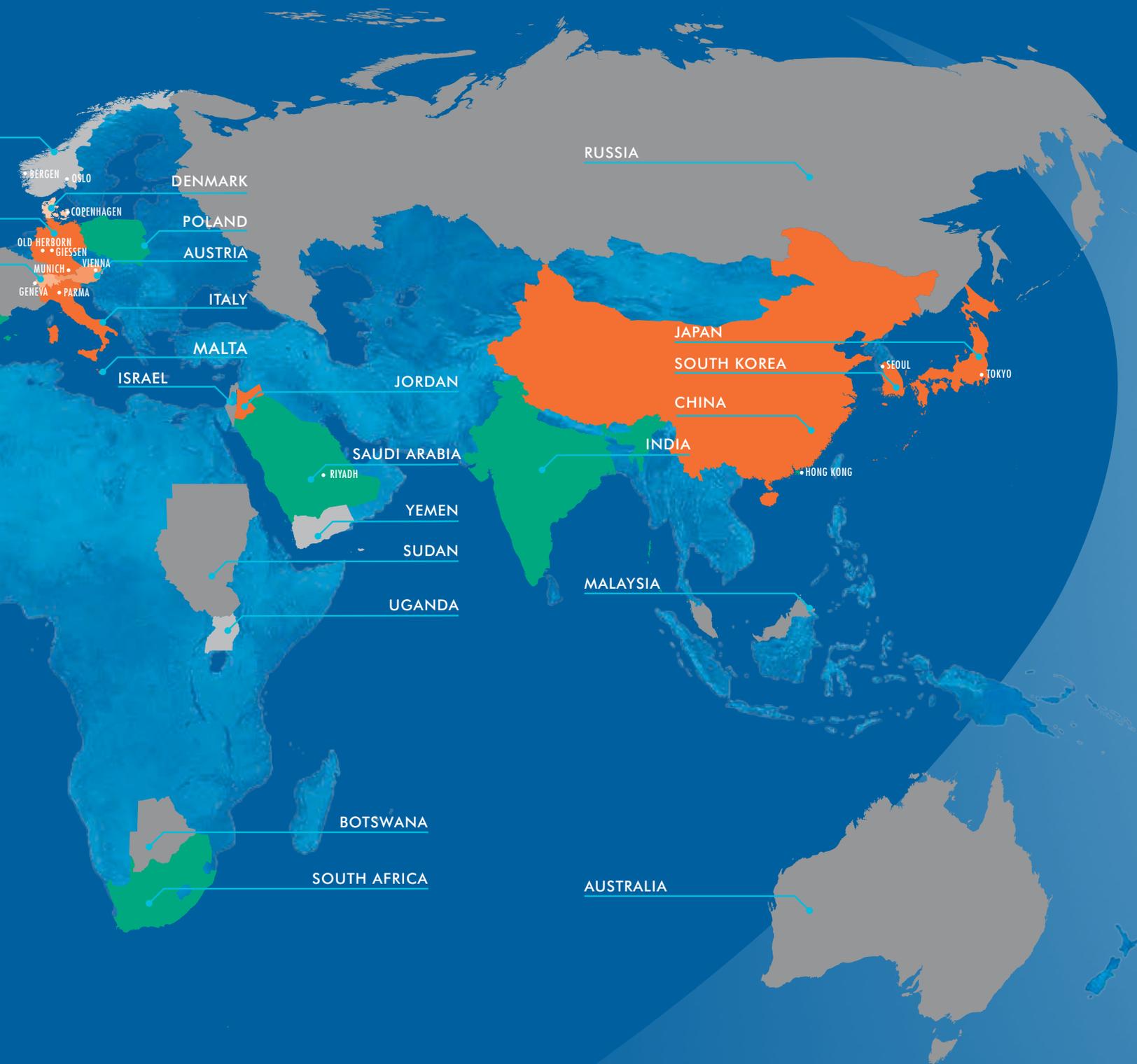
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Global Impact



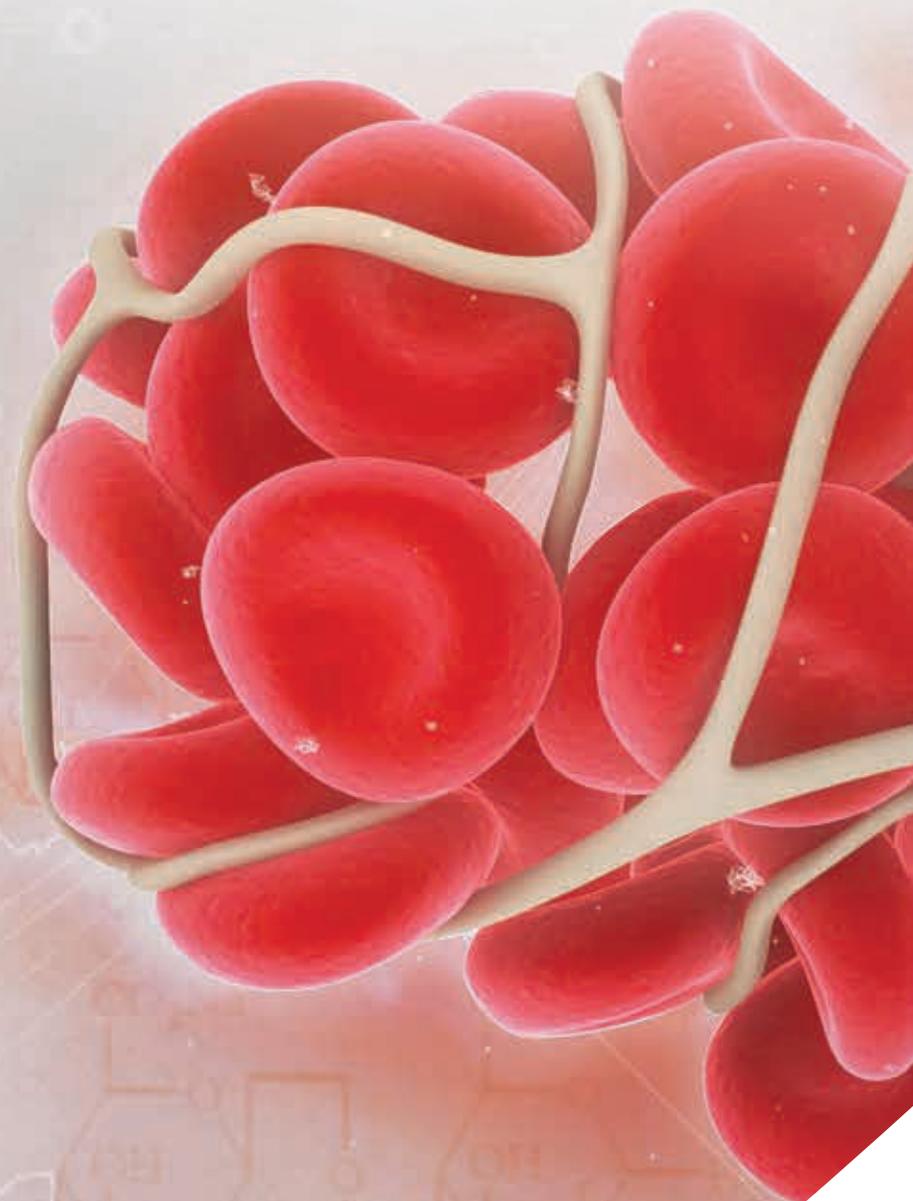
- Knowledge Translation
- Research Collaborations
- Knowledge Translation & Research Collaborations

Our researchers travel the globe sharing their knowledge and discoveries with international health care leaders.

St. Joseph's Healthcare Hamilton researchers collaborate and lead multidisciplinary research teams around the world.

Protecting Critical Care Patients Against Blood Clots

The PROTECT study discovered that low molecular weight heparin was more effective than the standard heparin (unfractionated) at preventing blood clots in the lung.



“These results will lead to changes in practice at the bedside, leading to better outcomes for our patients.”

DR. DEBORAH COOK



Every person in the world has blood flowing through their veins. What happens when that blood forms a clot inside a blood vessel? This condition is known as thrombosis. The very fluid that keeps us alive can cause very serious problems when thrombosis deprives certain areas of the body of oxygen and nutrition. Thromboembolism occurs when an internal blood clot is carried by the blood stream to obstruct another vessel. It is estimated that thromboembolism affects up to 10% of the sickest patients in our health care system, and is particularly prevalent in Intensive Care Units (or ICUs). As thromboembolisms can plug vessels to major organs, they can lead to pulmonary embolisms, stroke or death.

The **Pro**phylaxis for **T**hrombo**e**mbolism in **C**ritical Care **T**rial (or PROTECT) study is a global project that was initiated and led by SJHH researcher Dr. Deborah Cook. PROTECT tested a low molecular weight heparin against the previously established standard heparin in order to determine effectiveness and safety outcomes. Heparin is a widely used anticoagulant, which is injected subcutaneously. Data for this study was compiled from 67 ICU units worldwide – including hospitals across Canada, United States, United Kingdom, Australia, Brazil and Saudi Arabia.

PROTECT discovered that the low molecular weight heparin is 50% more effective in

guarding against blood clots in the lungs (pulmonary embolism) than the previously established standard dose heparin and carried a lower risk of adverse side effects when compared to the standard dose.

“We were grateful to gain better insights due to the collaborative efforts of the patients, families, doctors, nurses, pharmacists and ultrasound technologist,” said Dr. Cook, Professor of Medicine, Clinical Epidemiology and Biostatistics. “These results will lead to changes in practice at the bedside, leading to better outcomes for our patients. They will also be helpful to further understand the causes of deep vein thrombosis, and what we might do to prevent blood clots.”

Findings from studies such as PROTECT often become translated into standard practice, improving the way in which health care is practiced. St. Joseph’s Healthcare Hamilton and many other health care centres in Canada have implemented the results of PROTECT. The results of this study have been incorporated into practice guidelines established by the Society of Critical Care Medicine, which will help to decrease potentially fatal blood clots in critically ill patients worldwide. ●

A Simple Test Can Foresee Heart Attacks

Researchers from St. Joseph's Healthcare Hamilton recently took part in a study which determined that a simple blood test can predict a heart attack for up to 30 days after surgery.



Many people are unaware that heart injury can occur following major surgery. Two hundred million adults undergo non-cardiac surgical procedures every year and over 1 million of them die within 30 days, many due to heart damage. It is not unusual for the heart to overexert itself in a post-operative state, which can lead to serious cardiac issues.

“Because of the use of analgesic drugs such as morphine, patients often don’t feel the symptoms of heart injury taking place in a post-surgery state,” explains Dr. Maria Tiboni, local principal investigator of the **V**ascular Events in Noncardiac **S**urgery Patients **C**ohort Evaluation (VISION) study and SJHH researcher. “In the case of non-cardiac surgery, this lack of symptoms causes both patients and physicians to be unaware of an impending heart attack.”

The VISION study was designed by Dr. J.P. Devereaux of McMaster University. Study participants were asked if they would agree to have a simple blood test administered within three days following surgery. The test measured the levels of a regulatory protein named troponin T. When the heart is under stress, it releases troponin T into the blood stream.

Researchers concluded that if troponin T levels in patients after surgery were abnormally high, a heart attack may be imminent. This proved true in many kinds of surgical interventions with the exception of cardiac surgery, as all patients undergoing cardiac surgery experience some form of heart injury.

“Studies like this wouldn’t have been possible without

medical help and scientific collaboration,” states Dr. Tiboni. “This study featured collaboration between many of St. Joseph’s diverse research areas, along with the assistance and cooperation of physicians and surgeons.”

Doctors now have a new way to track post-surgical patient recovery. Implementation of these findings could save thousands of lives worldwide every year. Studies such as VISION represent the epitome of SJHH research – where collaboration and innovation strive to make lasting improvements to patient care. ●

PATIENT STORY

JOAN SMITH* received an ankle arthroplasty at SJHH and was enrolled in the VISION study. Her troponin T levels indicated the possibility of cardiac injury.

The day following her surgery, she began to feel a pain in her back and shoulders. After analyzing her Troponin T levels, she was referred to an SJHH cardiologist, who confirmed that she suffered a mild heart attack. The patient was given treatment and allowed to recover before being released a few days later. The heart attack was mild and may have gone undiagnosed had it not been for the VISION study.

Her referral to a cardiologist resulted in her receiving cardiac medication which successfully treated her heart problems. This treatment may have also prevented another potential heart attack as a result of undiagnosed heart injury.

“I hope that the results of this study can be implemented into health care practice on a larger scale,”

states the patient. This would make it possible for medical personnel to respond to heart injuries resulting from surgeries in a quick and effective fashion.

* Name changed to protect patient privacy.

A New Physiotherapist Brings Her Expertise to St. Joseph's



RT-300 SUPINE BICYCLE
Image Credit:
Restorative Therapies

Dr. Michelle Kho,
a physiotherapist
and ICU researcher,
joins SJHH as a
welcome addition to our
research community.



Research

at St. Joe's demands new talent in order to remain at the cutting edge of medical innovation. We are pleased to welcome Dr. Michelle Kho, who is poised to continue the legacy of exemplary research taking place within our hospital.

Dr. Kho completed her physiotherapy training and Ph.D. at McMaster University. She cares for patients in our Intensive Care Unit (ICU) and is a faculty member in the School of Rehabilitation Science at McMaster University. Recently, she completed a fellowship at Johns Hopkins University in Baltimore, Maryland where she studied electrical muscle stimulation in mechanically ventilated patients.

For over ten years, Dr. Kho was mentored by Dr. Deborah Cook, one of St. Joseph's most prolific researchers. Dr. Deborah Cook is the 2013 winner of our Anne and Neil McArthur Research Award, making her the first SJHH researcher to do so. Dr. Kho was recruited to return to Hamilton and help to make a difference through her clinical research. "I am excited to join the St. Joseph's Healthcare team and contribute to this world-class hospital," she stated.

Dr. Kho will work together with the ICU team, including physiotherapists, occupational therapists, respiratory therapists, nurses, physicians and families, to carry out several new innovative studies on patient rehabilitation. Survivors of critical illness typically have serious disability, with

up to one in four having severe leg weakness impairing their quality of life for long after their ICU discharge. Dr. Kho's research aims to help patients recover faster from their ICU stay. Her main research uses the RT-300 supine bicycle, which allows patients to work on strengthening their legs while they are in their hospital beds. Over 3.8 million miles have been counted on RT-300 machines around the world, which spans the distance from Earth to the moon 16 times. The heavy use of the RT-300 demonstrates its ability to be a valuable tool for rehabilitation.

Dr. Kho's studies will enable St. Joseph's to be the first hospital in Canada to use the RT-300 supine bicycle for the rehabilitation of patients in intensive care. She is interested in studying the use of this machine during the first few days of mechanical ventilation. If in-bed leg cycling can prove to be beneficial to critically ill patients throughout this phase, it may prove to be a valuable tool for faster rehabilitation.

Researchers such as Dr. Kho bring new talent and expertise to St. Joseph's Healthcare. With innovative research that continually pushes the boundaries of medical practice, our institution is able to change the lives of patients, not only within the community, but across the country and around the world. ●

A
CLOSER
LOOK

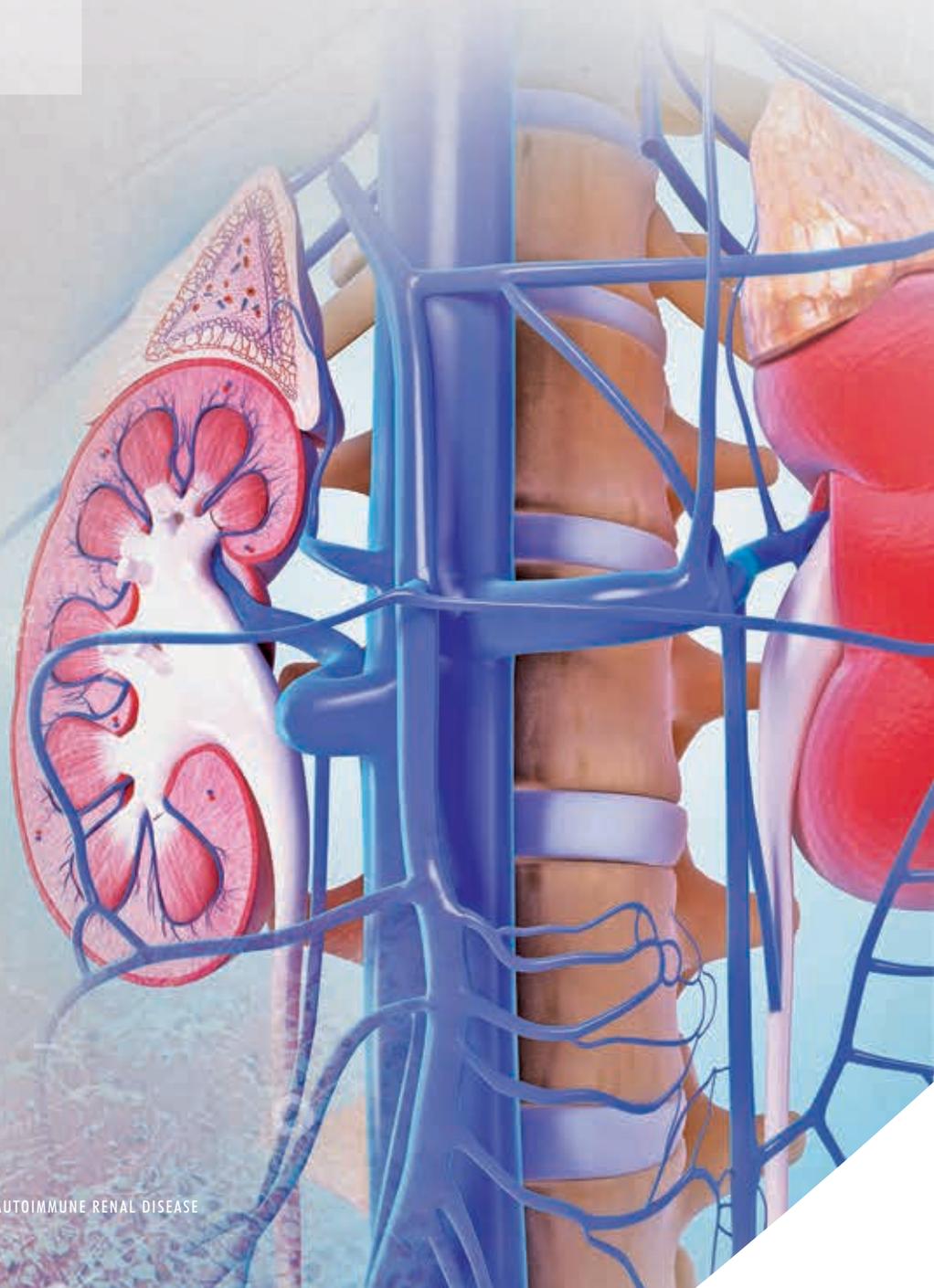


Image Credit: Restorative Therapies

DEVELOPED by Restorative Therapies, the RT-300 supine bicycle stimulates both legs and trunk while in a supine position. Up to 16 muscle groups can be targeted. The portable system uses Functional Electrical Stimulation (FES) to stimulate nerves, ideal for patients who have lost all or partial control of their muscles.

The World's Largest Trial of Autoimmune Renal Disease

PEXIVAS, the world's largest clinical trials in vasculitis (destruction of the blood vessels through inflammation) has received over \$5 million in grant funding.



“Answering these important questions about how to treat kidney disease is only possible by performing large studies that require global cooperation.”

DR. MICHAEL WALSH



Our kidneys work hard to remove waste products and toxins, produce hormones that control bodily functions, and regulate the levels of minerals and fluids in our body. Each day, as many as 15 Canadians learn that their kidneys have failed and over 23,000 Canadians are currently on dialysis. Nearly 1.3 million Canadians suffer from moderate to severe forms of kidney disease.

Dr. Michael Walsh, nephrology researcher at SJHH, is the co-principal investigator of the PEXIVAS (Plasma Exchange and Glucocorticoids for Treatment of Anti-Neutrophil Cytoplasm Antibody [ANCA]-Associated Vasculitis) study. PEXIVAS will test two treatment strategies, plasma exchange and glucocorticoids, for patients with kidney disease caused by ANCA (anti-neutrophil cytoplasmic antibodies). Plasma exchange may rapidly remove ANCAs to control the disease quickly and prevent kidney damage.

In addition, PEXIVAS will determine if lower doses of glucocorticoids is safer than doses commonly used.

PEXIVAS is funded by the Canadian Institute of Health Research (CIHR), the National Institute of Health Research of the UK, the US Food and Drug Administration, the National Health and Medical Research Council of Australia, and Assistance Publique of France. Grants for PEXIVAS have totaled more than \$5 million. The study is enrolling 500 patients with ANCA-associated vasculitis affecting their kidneys or lungs and is being conducted at over 60 health care institutions in Canada, the UK, Australia, and the US.

“Answering these important questions about how to treat kidney disease is only possible by performing large studies that require

global cooperation,” states Dr. Walsh, co-investigator of the study and nephrology researcher at SJHH.

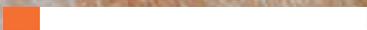
“PEXIVAS is important not only because it will help answer two important questions about the best way to provide care for patients with ANCA-associated vasculitis but also because it helps lay a foundation to conduct further large studies in vasculitis and kidney disease by developing a robust network of physicians, researchers, funders of research and patients.”

Designing and participating in global health initiatives such as PEXIVAS gives our researchers the ability to transform the practice of nephrology worldwide. Researchers such as Dr. Walsh can potentially change the treatment of kidney disease and the lives of patients suffering from vasculitis. ●

A Vaccine for Cat Allergies

Dr. Larché's research has led to the development of a new vaccine which effectively treats cat allergies without the risk of harmful side effects.

12 PERCENT OF THE POPULATION IS ALLERGIC TO CATS



30 CAT ALLERGIES ACCOUNT FOR 30% OF ALLERGY-RELATED ASTHMA



37 PERCENT OF CANADIAN HOUSEHOLDS HAVE A CAT IN THE HOME



DR. MARK LARCHE

Image Credit: McMaster University

In 2011,

Dr. Mark Larché began the first clinical trials of a vaccine that successfully treats cat allergies.

After ten years of research in both Canada and the UK, Dr. Larché developed a treatment that is safe, effective and reasonable. Rather than having to avoid cats or rely on traditional allergy shots with a large amount of potential side effects, Dr. Larché's peptide immunotherapy requires only four vaccines over a three month period in order to achieve twelve months of protection. Furthermore, none of the side effects from traditional vaccines are present with use of Larché's treatment.

While many people believe that cat hair is the cause of their reactions, the actual allergen is found in the dander and saliva of the animals, which humans are exposed to through natural breathing. Research shows

that over twelve percent of the general population is allergic to cats, and sensitivity to cats is responsible for almost 30 percent of allergy-related asthma.

Larché and his research team analyzed one protein found in the dander of cats that is the source of most allergic problems. Using blood samples from 100 volunteers, Larché's team identified the regions of protein that activate T-cells in participants' immune system. Then, they found seven peptides within these regions, which they synthesized in order to create the vaccine. The vaccine is currently being tested by Circassia Ltd., a UK biotechnology company founded by Dr. Larché and Dr. A.B. Kay, and Adiga Life Sciences, a joint venture developed between Circassia Ltd.

and McMaster University. Researchers are still discovering exactly how the vaccine works, and the ways in which it changes the immune responses of patients. In 2012, Larché's research team successfully competed for a US National Institutes of Health grant to further their study of asthma and such airborne allergens at St. Joe's. \$6.5 million dollars were awarded to the researchers in order to continue their study of the vaccine, as well as how white blood cells that are targeted by the vaccine contribute to asthma. Dr. Larché's work is the epitome of innovative research at SJHH. This research could relieve the suffering of approximately 560 million people around the globe who are allergic to cats. ●

RESEARCHER PROFILE

DR. MARK LARCHÉ

DR. MARK LARCHÉ was born in London, England, and completed his Ph.D in immunology in 1990 at the University of London. He spent three years at St. Jude Children's Research Hospital in Memphis, Tennessee as a postdoctoral fellow. After practicing for several years in the UK, Dr. Larché was recruited to McMaster in 2006, and took up the McMaster University/GSK Chair in Lung Immunology at St. Joseph's Healthcare Hamilton in 2008.

Dr. Larché has authored over 100 scientific papers and has been the recipient of several international prizes including The Respiratory 2000 International Young Investigator Award, The Henning Lowenstein Research

Award 2000 and the Pharmacia Allergy Research Foundation Award in 2001. Together with Dr. A.B. Kay, he founded "Circassia Ltd.", a biotechnology company to develop vaccines for allergic diseases. Dr. Larché's research interests include the immunopathogenesis of asthma, immunological mechanisms of immunotherapy, pathogenesis of autoimmune diseases and graft rejection.

From the United Kingdom to Canada with United States support, Dr. Larché and his team have managed to create a vaccine that has the potential to provide relief to an ailment affecting many people around the world.

Basic Science Leads to Better Patient Care

Studies conducted by SJHH nephrology and urology researchers begin in the laboratory and end with improvements to the way patients are treated.

Biomedical researchers typically begin their work in laboratories – working with the building blocks of life in order to construct solutions for current ailments. For some researchers, such as Dr. Rick Austin, the analysis of various cells, proteins and genes at a microscopic level makes up the core of their practice. Basic science research can lead to new knowledge and scientific capital, which can then be used in the development and creation of new drugs, therapies and treatments.

Currently, Dr. Austin's research team is working on two major studies – an analysis of the GRP78 protein as well as the role of a new novel gene named TDAG51.

The researchers have found that when GRP78 is present on the surface of cancer cells, the immune system creates anti-GRP78 auto-antibodies which target the GRP78. During in vivo testing, these anti-GRP78 auto-antibodies have been shown to increase tumor cell growth and blood clotting potential by activating tissue factor. This discovery could also explain why there is a significant risk of blood clots in prostate cancer patients. Dr. Austin's research team have now developed specific bioactive agents that can bind to these anti-GRP78 auto-antibodies in order to block their interaction with GRP78; reducing the spread of



cancer and decreasing the development of life-threatening blood clots. This research led to a development and patent to measure the levels of anti-GRP78 auto-antibodies in blood, which can predict the patients' risk level for developing thrombotic blood clots.

Dr. Austin's team also analyzes the role of a new novel gene named TDAG51, which is expressed in the blood vessels of mice with vascular calcification. Vascular calcification is the presence of calcium buildup within the blood vessels of patient's with end stage renal disease. This phenomenon causes their blood vessels to harden and become stiff, leading to various kinds of ailments including high blood pressure, blood clots and heart problems. Vascular calcification is considered to be caused by the transformation of smooth muscle cells to bone cells in the blood vessels. Dr. Austin's research team has now demonstrated that the overexpression of TDAG51 in smooth muscle cells is critical in this transformation process.

Consistent with these findings, mice deficient in the TDAG51 gene are significantly

protected from developing vascular calcification. Dr. Austin's team has successfully identified this gene to be responsible for vascular calcification in mice, which enables this kind of treatment to be effective. In analyzing the properties of molecular units, genes such as TDAG51 often become the target for potential drug discoveries.

"Everything begins with basic science," states Dr. Austin. "The work done in the lab today eventually becomes the basis for what is taught in academic institutions in ten or twenty years' time."

After basic science research takes place in the lab, applied testing occurs in vivo. After a new medical discovery has been extensively tested independently and in vivo, clinical testing occurs in collaboration with volunteer research participants. If successful, findings from such studies will help millions of people who suffer from thrombosis, vascular calcification and other related conditions. •

RESEARCHER PROFILE

DR. RICK AUSTIN

DR. RICK AUSTIN is the Research Director of the Hamilton Centre for Kidney Research. Dr. Austin received his Ph.D. in Medical Sciences from McMaster University and has trained as a Postdoctoral Fellow in the Department of Human Genetics at the Hospital for Sick Children in Toronto. Dr. Austin is currently a Professor of Medicine in the Division of Nephrology, McMaster University and St. Joseph's Healthcare Hamilton. He is also a Career Investigator of the Heart and Stroke Foundation of Ontario and holds the Amgen Canada Research Chair in Nephrology.

Dr. Austin and his research group have published over 100

peer reviewed papers, book chapters and academic articles. Ultimately, the goal of Dr. Austin's research program is to better comprehend the underlying cellular stress pathways involved in the development and progression of cardiovascular and kidney diseases.

The work undertaken by researchers such as Dr. Austin is crucial to the culture of inquiry and research at St. Joseph's Healthcare Hamilton. By conducting both cardiovascular and nephrology research, Dr. Austin successfully manages to synthesize his

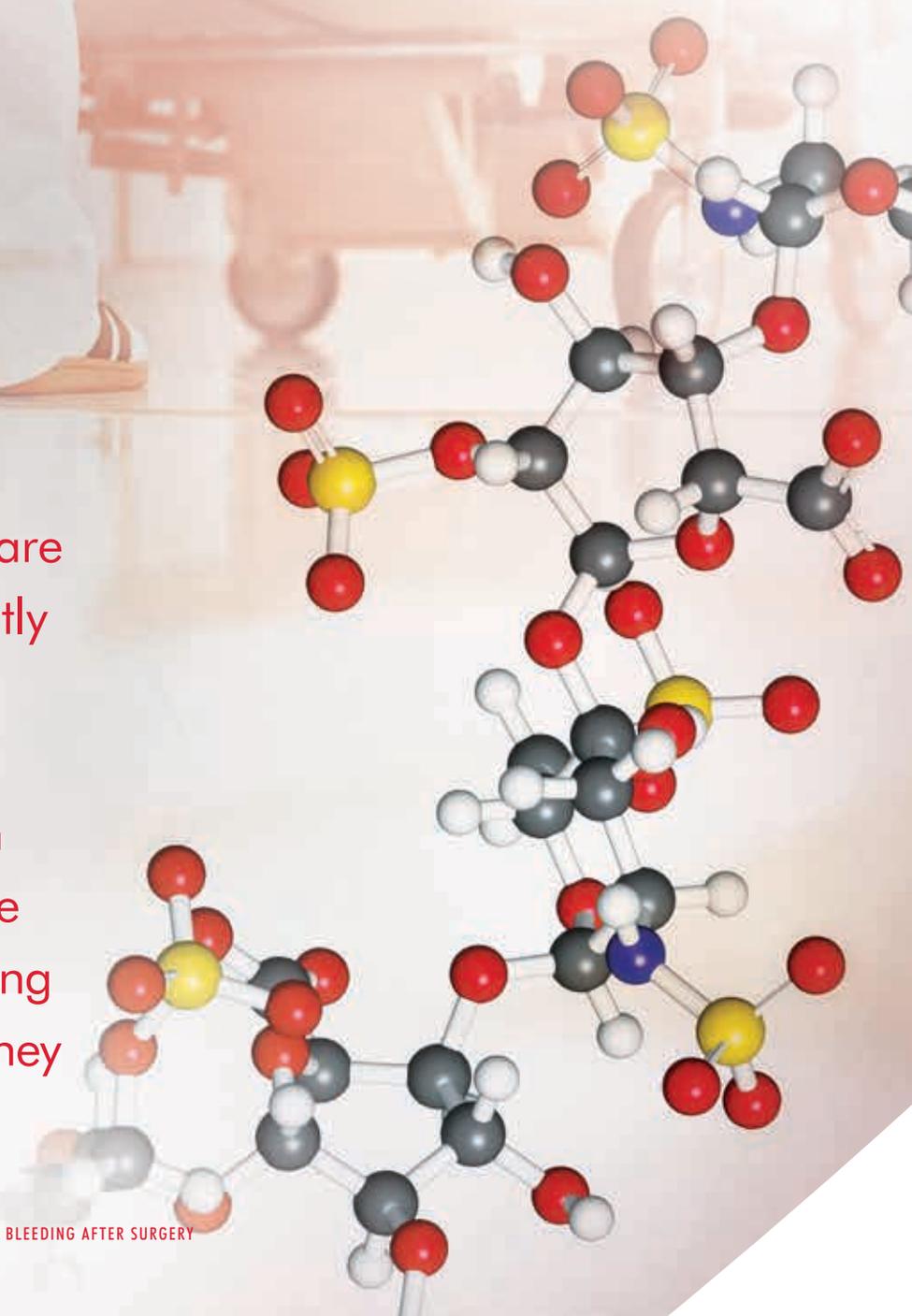
abilities in order to offer unique, innovative and valuable research.

"We are extremely fortunate because medical research is something that we love to do and are passionate about. There is no other position that I would rather have," explains Dr. Austin.

"When you discover something unique and interesting that could impact many people who suffer from kidney or cardiovascular disease, it's very gratifying, not only for me but for the graduate students and trainees who devote themselves to this research in my lab."

Balancing the Risk of Clotting and Bleeding After Surgery

Researchers from St. Joseph's Healthcare Hamilton are currently completing a study that will determine whether patients with kidney transplants are at higher risk of clotting or bleeding after kidney transplant surgery.



“The REPORT study would not have been successful without teamwork from quality researchers.”

DR. CHRISTINE RIBIC



Clotting

in the deep veins of the legs or the lungs can result in pain, heart or lung disease and may lead to death if unrecognized or untreated. Risk factors for clotting include surgery, hospitalization and immobility. Up to 30% of patients may experience a clot during or after hospitalization and surgery, and some of these events may not result in symptoms. Many people undergoing surgeries receive a small dose of a blood thinner that can reduce the risk of developing a clot in the legs or the lungs. Although, giving a low dose of a blood thinner is considered routine practice after many surgeries, the risk or benefit in patients after kidney transplant is uncertain and prescription practices among doctors across Canada differ widely.

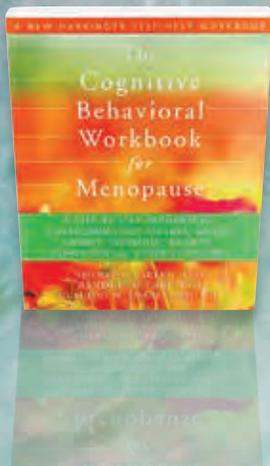
The **R**isk of Thrombo**E**mbolism in Patients **P**ost **R**enal **T**ransplantation (REPORT) study was designed to examine the risk of clotting in the legs or lungs as well as the risk of bleeding after kidney transplant surgery. Serial ultrasounds of the legs were performed at various times after surgery to screen for blood clots. The goal of the study was to find out the amount of clotting and/or bleeding after kidney transplant surgery, which will help in making recommendations regarding the use of low dose blood thinners in patients after kidney transplant surgery.

The REPORT study led by transplant nephrologist Dr. Christine Ribic was truly a collaborative effort among researchers from diverse specialties. “The REPORT study would not have been successful without

teamwork from quality researchers from the Divisions of Nephrology [Dr. Azim Gangji; Dr. Catherine Clase]; Hematology and Thrombosis [Dr. Mark Crowther], Radiology [Dr. Andu Coret; Sriharsha Athreya], Urology [Dr. Anil Kapoor] and Critical Care [Dr. Deborah Cook]”, said Dr. Ribic. “We also need to recognize the 120 enrolled volunteer patients that attended up to seven follow-up appointments over the course of a year – without their dedication we would not be able to gather the results to inform medical decisions for future transplant patients”, states Trevor Wilkieson, Senior Research Coordinator.

The Kidney Transplant Program at St. Joseph’s Healthcare Hamilton provides an ideal environment for study of clotting and bleeding in patients after kidney transplant. It is a regional referral centre for kidney transplantation for a population of 1.2 million people. Annually, the Program performs approximately 100 renal transplants. This is the first study done in a Canadian kidney transplant population examining the incidence of clotting and bleeding after surgery. The results of this study will not only help inform decisions about providing low dose blood thinners to patients after kidney transplant surgery at St. Joseph’s Healthcare Hamilton but it will also provide information to guide physicians across the nation. ●

Achieving Drug-Free Menopause Relief



THE COGNITIVE BEHAVIORAL WORKBOOK FOR MENOPAUSE
New Harbinger Publications, 2012

Dr. Green's findings have noted that cognitive-behavioral therapy, or CBT, helps to alleviate both the physical and emotional symptoms that are associated with menopause.



DR. SHERYL GREEN
DR. RANDI McCABE

In 2007,

Dr. Sheryl Green was the recipient of the St. Joseph's Healthcare Father Sean O'Sullivan Novice Researcher Award for her work involving the development and implementation of a cognitive-behavioural intervention for symptoms of menopause. She recently published a self-help workbook through New Harbinger Publications in collaboration with fellow SJHH researchers Drs. Randi McCabe and Claudio Soares.

"The FSORC award made my research possible," states Dr. Green. "Without this support, I wouldn't have been able to conduct my research that formed the basis of our book."

CBT is an approach that addresses dysfunctional emotions, cognitions, and behaviors through a systematic process. However, it has been shown to alleviate the physical symptoms of menopause such as pain and hot flashes as well as medication or prescribed treatments. While Hormone Replacement Therapy remains the most popular treatment for menopausal symptoms, studies suggest that it may present risks with long-term use – such as elevated risks of cardiovascular problems and breast cancer for some women.

In light of these risks, an alternative approach was necessary in order to relieve menopausal symptoms for women who are unable or unwilling to use hormones, women who prefer a non-medicinal treatment approach or women who need to combine different treatment options to improve their quality of life and overall well-being.

In addition to treating pain and hot flashes, cognitive-behavioral therapy successfully treats the mood swings, anxiety, depression and sexual concerns that can be associated with menopause. As a result, research participants have indicated a significant improvement in their quality of life after attending the CBT treatment program.

Dr. Green was surprised at just how beneficial the research participants found the CBT approach. "Participants had a significant reduction of both physical and emotional symptoms related to menopause, indicated that they were highly satisfied with the results of the program, and would recommend this CBT approach to others with similar symptoms."

This unique approach to women's health demonstrates how the research conducted at St. Joseph's Healthcare Hamilton directly improves patient care. The publication of The Cognitive Behavioral Workbook for Menopause has the ability to reach a global audience and thus greatly increase the number of people who will benefit from this research.

"The workbook works well in conjunction with one's treating clinician. However, this book can reach women at home and offer relief from some their symptoms before they enter the clinic," explains Dr. Green. ●

PATIENT
STORY

BARBARA COULAS is a 63-year old woman who has been suffering from the symptoms of menopause for many years. After learning the cognitive-behavioural therapy techniques from Dr. Green, Barbara was effectively able to treat her hot flashes, anxiety and depression.

"My only regret was that I didn't do this sooner," states Barbara. "It was a life-saving tool for me. I was finally able to be at peace."

She found that after a month of applying the CBT strategies that Dr. Green had taught her, she was able to automatically catch herself

falling into negative thought patterns. Barbara developed the habits to treat both the physical and emotional symptoms of menopause as soon as she felt them.

"Women are very open to this kind of treatment," explains Barbara, reflecting on her treatment with Dr. Green. "I hope that this type of treatment will become more readily available for women."

**"It was a life-saving tool for me.
I was finally able to be at peace."**

Improving the Treatment of Depression

SJHH researchers are taking part in a national study which seeks to discover the most effective treatments for various patients suffering from clinical depression.



“We hope to identify early predictors of treatment response in order to shorten the time of patient recovery, and avoid keeping patients on treatments that will not work.”

DR. BENICIO FREY



Clinical depression is a debilitating illness worldwide. It is estimated that one in ten Canadians suffer from in this mood disorder at one point throughout their lives. Clinical depression results in a lower quality of life, and makes it very difficult for a person to go about their daily routine.

Although a variety of treatments for depression are available, there is currently no way to predict ahead of time which treatment will work best for which individual. Previous studies have discovered that there are differences in brain structure and function in people with depression compared to those without depression that can be measured with magnetic resonance imaging (MRI).

A national study is looking to answer two fundamental questions regarding the treatment of clinical depression. First, it aims to identify indicators – such as specific patterns of brain function or particular genes or proteins – which would indicate which particular patient would respond best to the

treatment. Second, the study will track the treatment progress of patients in order to identify which type of treatment is most effective for particular patients at two, eight and 16 weeks.

“With this study design, we hope to identify early predictors of treatment response in order to shorten the time of patient recovery, and avoid keeping patients on treatments that will not work,” states Dr. Benicio Frey, co-investigator of the study as well as the Director, Women’s Health Concerns Clinic and Academic Head, Mood Disorders Clinic.

SJHH researchers taking part of this study have the opportunity to create lasting changes regarding the treatment of clinical depression. Their work may lead to universal improvements in mood disorders practice and improve the lives of those struggling with clinical depression. ●

Health Care Begins with Diagnostics

Dr. James Mahony's lab developed the first FDA approved multiplex PCR diagnostic test, which detects the presence of 20 respiratory viruses simultaneously.



“This respiratory virus test culminated from an innovative approach pushing the limits of existing technology resulting in a major improvement in our ability to diagnose respiratory virus infections.”

DR. JAMES MAHONY

Before

a physician can administer treatment, they must be aware of the particular infections that their patients are suffering from. Without proper diagnostics, modern health care is incapable of treating patients appropriately.

Under the leadership of Dr. James Mahony, Director of the Regional Virology & Chlamydiology Laboratory, SJHH researchers developed the first FDA-approved PCR diagnostic test. This test detects the presence of 20 respiratory viruses simultaneously using nasal swabs.

Unlike other respiratory diagnostics that may take several hours or days, Dr. Mahony’s multiplex PCR test is sensitive, fast and detects additional viruses not detected by traditional methods. The test also identifies the emergence of new influenza strains like the pandemic strain of 2009.

Because of these characteristics, this innovative test was the first multiplex PCR test for respiratory viruses approved by the Food and Drug Administration, an agency of the United States Department of Health and Human Services. Licensed to Luminex Molecular Diagnostics in Toronto, Dr. Mahony’s multiplex PCR test is now being used in clinical laboratories around the world.

“This respiratory virus test culminated from an innovative approach pushing the limits of existing technology resulting in a major improvement in our ability to diagnose respiratory virus infections,” states Dr. Mahony.

However, the original test is being continuously improved, with a third version undergoing a

multi-center clinical evaluation in Canada and the United States. SJHH researchers are dedicated to developing diagnostics that are relevant and up to date, improving them wherever possible.

Dr. Mahony and his research team are currently developing next generation respiratory diagnostic tests for point-of-care settings such as the emergency department to quickly detect respiratory viruses and assist infection control teams. Better diagnostics lead to better treatments, which ultimately result in better patient care. Physicians around the world are now able to use Dr. Mahony’s multiplex PCR test to diagnose respiratory virus infections in patients more effectively. ●

Saving Lives Using Unconventional Treatments

Fecal transplantation, the subject of a study led by St. Joseph's Healthcare Hamilton researcher Christine Lee, prove to be effective in treating *C. difficile* infection in over 90% of cases.



DR. CHRISTINE LEE

Clostridium difficile is a spore forming anaerobic bacterium which can cause severe illnesses and chronic diarrhea. It occurs when competing bacteria in the digestive tract have been eliminated due to antibiotics. As a result, the colon is flooded with *C. difficile* bacteria, which produce toxin causing havoc on the patient's body, resulting in extreme discomfort, pain, and in some cases – death.

Since 1996, *C. difficile* infections (CDI) have tripled, and their mortality rates range for 6% to 30%. It is estimated that 300,000 Canadians become afflicted with the infection every year, and a conservative estimate would indicate that 30,000 people die every year as a result of CDI. Dr. Christine Lee, Infectious Disease Specialist at SJHH, studies the effectiveness of fecal transplants in the treatment of refractory/recurrent *C. difficile* infections.

Fecal transplantation is the process of introducing fecal bacteria from a healthy donor into an infected recipient. The healthy bacteria are then able to balance out gut flora levels in the colon, resulting in a cure for the patient.

For patients who do not respond to the standard antibiotic treatments for *C. difficile* infection, fecal-transplantation may provide a rapid and effective solution.

“We can treat patients with CDI globally offering fecal transplant by using frozen-and-thawed donor specimens as the outcome of using frozen specimens appears to be equivalent to the fresh ones,” states Dr. Lee.

While quite unusual, this contentious procedure offers relief to patients who could not be cured through other methods. The procedure has been performed on over 120 patients at SJHH.

Dr. Lee's work has managed to save lives and control outbreaks of *C. difficile* infection. The impact of this research extends beyond Hamilton, Ontario, providing valuable therapy to patients worldwide and assisting in controlling *C. difficile* outbreaks in health care institutions. ●

A PATIENT'S PERSPECTIVE

WHEN PAT GALLACHER was diagnosed with *C. difficile* infection, she was very surprised. A nurse for 38 years, Pat took all of the necessary steps to protect herself from catching *C. difficile* when she was taking antibiotics for pneumonia. Unfortunately, despite her diligence, she acquired a *C. difficile* infection which caused her to feel very sick and lose 20 lbs.

After being prescribed antibiotics which weren't effective in treating her infection, Pat's family doctor referred her to Dr. Christine Lee at St. Joseph's Healthcare Hamilton. As part of Dr. Lee's research study, Pat was able to receive a fecal transplant procedure. Within the next week, Pat reported feeling her energy coming back. She was able to eat again and

move around without being restrained by her illness.

“I felt really lucky that this was offered to me,” Pat shares. “If I didn't have this fecal transplant, I don't know what I would've done – I couldn't eat.”

Pat was able to make a full recovery approximately two months after her procedure. She reports that the procedure felt easy and non-invasive, taking only a minute to complete.

“They made me feel like I contributed to a greater good. I really hope that this treatment becomes an accepted practice – I feel like it saved my life.”

Redefining the Robotic Surgery Curriculum

The development of a training tool for robotic surgery will allow urologists to perform more effective operations.

Image Credit: Intuitive Surgical®

“It’s rewarding to see the impact our leadership is having on the training of future surgeons, and the way that we are delivering surgical care.”

DR. BOBBY SHAYEGAN



Early in 2012, thanks to a remarkable gift of \$5 million from the Boris family (who are local entrepreneurs and founders of Mountain Cable), St. Joseph’s Healthcare Hamilton became one of the few hospitals in Canada to acquire a dual-console da Vinci Si Surgical Robotic System. One year later, surgeons at the Hospital have performed just over 100 robotic-assisted surgeries.

Across the globe, the most common area for robot-assisted surgical techniques is in urologic procedures. While the amount of published research in this area is somewhat limited, recent work is beginning to show that robot-assisted laparoscopic prostatectomies are helping patients to demonstrate a faster recovery with less blood loss and fewer complications.

“It’s incredible to watch the difference robotic surgery is making in the lives of patients and surgeons. We feel that it won’t be long before robotic-assisted prostatectomies become the new standard of care for urology patients in Canada,” states Jen Hoogenes, Ph.D. Candidate and Research Coordinator at SJHH. “We need to find a way to train urology residents and fellows on how they can safely, quickly, and proficiently learn robotic surgery techniques by employing the da Vinci System.”

SJHH researchers have developed a preliminary inventory of critical steps that are required to perform a robot-assisted laparoscopic prostatectomy using the da Vinci Surgical Robotic System. This research is being used to create a training and assessment tool that will help urology residents to learn the practice of robotic surgery.

The training tool, being the first of its kind, is currently being evaluated by approximately

20 robotic surgery experts from Canada and the United States. After its evaluation, it will become used in practice with the goals of eventual incorporation into the urology curriculum and the use of the tool in other surgical centers.

SJHH is home to a dual-console da Vinci System, which allows surgeons to work side-by-side with their students to teach them specific surgical techniques in a safe manner. The dual-console provides the opportunity for students to watch entire procedures from the precise viewpoint of the surgeon, which is vital to understanding how the critical steps are performed during the procedure.

“We’re presenting an initial model of our tool at the upcoming annual meetings of the American Urological Association and the Canadian Urological Association, and we’re looking forward to hearing the feedback from the academic and surgical communities,” states Dr. Bobby Shayegan, Urologist and Head of Cancer Surgery at SJHH. “It’s rewarding to see not only the positive impact that robotic surgery is having on our patients, but to see the impact that our leadership in this area is having on the training of future surgeons, and the way that we are delivering surgical care – now and in the future.”

The development of this training and assessment tool will provide robotic surgeons with a more effective way to learn and practice their craft. The incorporation of this tool into urology curriculum worldwide would train surgeons of tomorrow in techniques that can result in better patient outcomes across the globe. ●

Creating Impact in the Developing World

The International Outreach Program is a Ministry of the St. Joseph's Health System (SJHS) that brings the quality of our health care to those around the world.

Today, the International Outreach Program holds continuing partnerships in Haiti, Uganda and Sudan.

The practice of health care in the developing world often suffers from a number of issues. The lack of trained physicians, medical supplies and infrastructure makes quality care nearly impossible. This causes illness, disease and other health ailments to go untreated, severely decreasing the quality of life for the citizens of many areas around the world.

St. Joseph's International Outreach Program (IOP) was created in 1986 to provide sustainable and effective health care to less fortunate nations. It is driven by the Sisters of St. Joseph's, private donors, and the doctors, nurses, engineers and lay-people that dedicate their lives to helping those global citizens most in need of help.

By providing training for medical staff, assistance with infrastructure and adequate medical supplies, the International Outreach Program has improved the practice of medicine in Russia, Yemen, Israel and Dominica. Today, the IOP holds continuing partnerships in Haiti, Uganda and Sudan.

The International Outreach Program has successfully managed to:

- > Maintain functional operating rooms in Haiti's Port-Au-Prince University Hospital which serves over 7 million people – before, during and after the 2010 earthquake
- > Provide medical education and annual training at two Ugandan medical schools, sending medical residents to SJHS on yearly rotations
- > Offer on-site training in fetal monitoring and ultrasound to staff in Sana'a, Yemen

The SJHS International Outreach Program is able to create change in our world by transforming the quality of health care in the places most in need of medical assistance. The medical practitioners taking part in the IOP program dedicate their time, their careers and ultimately their lives in order to change the way that medicine is practiced. ●

For more information
www.internationaloutreach.ca

Developed by the Past, Responding to the Present, and Shaping our Future

1957-1965 Sister Virginia Hanlan teaches student nurses



2010 International Outreach Program in Haiti



2014 New West 5th Campus building complete



The Sisters of St. Joseph came to Hamilton from France in 1854 in order to help the ill and impoverished in our growing city. Initially aiding patients in railway sheds located near the Hamilton Harbour, the sisters established a 25-bed hospital in the downtown core of our city in 1890. St. Joseph's Healthcare Hamilton was born from a desire to serve patients most in need of medical attention – and it is this desire which shapes the evolution and growth of our hospital.

Programs such as our International Outreach Program reflect the mission of the Sisters of St. Joseph in the 21st century. The "Mapping our Future" strategic plan draws from the mission, vision and values of the Sisters in order to guide the future development of institution. Driven by our history, we set out to create a culture of change and innovation in order to develop the practice of health care within our community and around the world. We also strive to foster community and interconnection, ensuring a positive and rewarding experience for our staff, patients and communities. Drawing from our past to create a better future, St. Joseph's Healthcare Hamilton is committed to the global realization of quality patient care.

In memory of Dr. Freddy Hargreave

Frederick (Freddy) Hargreave's legacy as an extraordinary physician, humanitarian and respiratory researcher will live on for years to come.



Born in Hong Kong, Dr. Hargreave completed medical school at the University of Leeds in England. After moving to London in 1964 to begin working as a house officer in respiratory medicine, Dr. Hargreave joined the Department of Health Sciences at McMaster University in 1969. He spent his entire career at the Firestone Institute for Respiratory Health, located within St. Joseph's Healthcare Hamilton.

Along with his contemporary Dr. Jerry Dolovich, with whom he built a strong medical collaboration and personal friendship, Dr. Hargreave developed new methods to diagnose and treat asthma. His article with Dr. Don Cockcroft described the methodology for the measurement of airway hyper-responsiveness associated with asthma. Cited over 1800 times by scientists around the world, this article is now regarded as a classic, pioneering work in asthma research.

In 1989, Dr. Hargreave developed the methodology for sputum induction and the measurement of inflammatory cells found in sputum. This led to the discovery of a new syndrome – persistent eosinophilic airway inflammation in the absence of asthma – which accounts for approximately 20 percent of patient referrals to respiratory clinics suffering from chronic persistent cough.

Thanks to Dr. Hargreave's development of a method to quantify cells in sputum, the Firestone clinic has become a world leader in the management of patients with severe asthma, COPD and chronic cough. Many hospital asthma clinics around the world have incorporated Hargreave's methodology based on this evidence of its effectiveness. A very high percentage of research leaders in Canada and around the world have trained alongside Dr. Hargreave in the Firestone Institute of Respiratory Health. Dr. Hargreave's previous fellows are currently leaders in research in over 20 countries. Not only did Dr. Hargreave's excellence help to develop SJHH as a leader in asthma research, but his innovative research helped to treat many patients suffering from respiratory illnesses worldwide.

"Dr. Hargreave is a shining example of a brilliant clinical scientist in the field of respiratory medicine. St. Joseph's Healthcare Hamilton was privileged to be the home base of this extraordinary researcher for the length of his career," notes Dr. Mark Crowther, VP of Research at SJHH. ●

2012

Father Sean O'Sullivan Research Awards

Research students and post-doctoral fellows form an integral back-bone of scientific research. In support of these endeavours, we are pleased to announce the recipients of the 2012 Father Sean O'Sullivan Research Awards. The recipients were selected by the Father Sean O'Sullivan Research Award Review Committee in a competition based upon the merits of the submitted research proposals.

Ms. Rachel Carlisle

TYPE OF AWARD // Studentship

SUPERVISOR // Dr. Jeffrey Dickhout

AREA OF RESEARCH // Chronic Kidney Disease, Nephrology

Ms. Carlisle's research aims to determine how the TDAG51 gene causes the development of renal fibrosis in chronic kidney disease. Renal fibrosis is the development of excessive connective tissue in the kidneys, often leading to kidney disease. Ms. Carlisle's research explores the underlying science behind this common ailment.

Ms. Bernice Tsoi

TYPE OF AWARD // Studentship

SUPERVISOR // Prof. Ron Goeree

AREA OF RESEARCH // Health Technology Assessment: Health Economics

While often extremely useful in treating patients, health technologies can pose a great financial burden upon health care institutions. Ms. Tsoi's research explores the use of several economic modelling approaches in order to assess the costs and consequences of health technologies. Her research aims to compare these modelling approaches in order to determine the situations when each of these should be adopted.

Dr. Sophocles Voineskos

TYPE OF AWARD // Studentship

SUPERVISOR // Dr. Achilleas Thoma

AREA OF RESEARCH // Clinical Epidemiology, Plastic and Reconstructive Surgery

Plastic surgery is increasingly becoming a prominent medical specialty. Dr. Voineskos' research explores the lack of evidence-based medical research and practice in the field of plastic surgery. His objective is to evaluate the overall quality of current plastic surgery literature and to examine the quality of reporting in plastic surgery, while uncovering the barriers to the use of evidence-based medicine by plastic surgeons.

Dr. Luciano Minuzzi

TYPE OF AWARD // Post-doctoral fellowship

SUPERVISOR // Dr. Benicio Frey

AREA OF RESEARCH // Psychiatry, Mood Disorders

Mental health is an important aspect of a person's wellbeing. Depressive disorders can leave a person with a diminished enjoyment of life. Dr. Minuzzi will investigate whether serotonin neurotransmission is the main working pathway for estrogen to act as an antidepressant in certain women with major depressive disorders.

Ms. Karen Anne Neufeld

TYPE OF AWARD // Post-doctoral fellowship

SUPERVISOR // Dr. Wolfgang Kunz

AREA OF RESEARCH // Neurogastroenterology

The human brain and the body's gastro-intestinal system often interact in order to carry out the daily bodily functions of our lives. Ms. Neufeld's work will examine the ways in which intestinal microbiota impact the development and function of the nervous system. Exploring these currently unknown pathways will demonstrate additional interconnectedness between the brain and gastro-intestinal system. 2012 TD Post-Doctoral Fellowship St. Joseph's Healthcare Hamilton is honoured to partner with the TD Bank Financial Group in order to offer a research grant for post-doctoral fellows. The TD Grants in Medical Excellence were established to provide funding support for professional development of a carefully selected research fellow.

Dr. Subhendu Mukherjee

TYPE OF AWARD // Post-doctoral fellowship

SUPERVISOR // Dr. Luke Janssen

AREA OF RESEARCH // Respiriology

Fibroblasts are types of cells known to be involved in chronic lung diseases. Dr. Mukherjee's work will explore the growth factors involved in human pulmonary fibroblasts. His study offers the potential for an entirely novel approach to treating pulmonary fibrosis and other chronic lung diseases.

2013

Anne and Neil McArthur Award

The Anne and Neil McArthur Research Award is presented annually and honours an internationally renowned researcher whose area of study is also a focus of research at St. Joseph's Healthcare Hamilton.

The award is funded by an endowment fund created by Anne and the late Neil McArthur, who are long time supporters of our research. It is hoped that this annual award ceremony will raise awareness of research activities at St. Joseph's Healthcare Hamilton and will encourage the brightest minds in Canada and throughout the world to pursue work areas of health research.

Award Recipient:

Dr. Deborah Cook

Deborah Cook practices critical care medicine at St. Joseph's Healthcare in Hamilton. At McMaster University, she is Professor of Medicine and Clinical Epidemiology & Biostatistics and Academic Chair of Critical Care Medicine. Dr. Cook is the first local researcher to win the Anne and Neil McArthur award. She has been a part of SJHH for over 22 years and is recognized as an academic leader in our institution. For more information on the PROTECT study led by Dr. Cook, turn to page 8.

Supported by a Canada Research Chair in Knowledge Translation in Critical Care, Dr. Cook has published over 500 peer-reviewed articles and has supervised many research trainees and junior academic faculty. From 2000 to 2008, she was Chair of the Canadian Critical Care Trials Group, launching the most productive ICU research consortium in the world. Dr. Cook has received numerous local, national and international awards for her clinical, educational and research excellence.

Featured Scientific Publications

Austin, R., et al. "Endoplasmic reticulum chaperone protein GRP78 protects cells from apoptosis induced by topoisomerase inhibitors." *Journal of Biological Chemistry* 278.23 (2003): 20915-20924.

Austin, R., et al. "TDAG51 is induced by homocysteine, promotes detachment-mediated programmed cell death, and contributes to the development of atherosclerosis in hyperhomocysteinemia." *Journal of Biological Chemistry* 278.32 (2003): 30317-30327.

Cook, D., et al. "Dalteparin versus unfractionated heparin in critically ill patients." *New England Journal of Medicine* 364.14 (2011): 1305-1314.

Devereaux, P. J., et al. "Association between postoperative troponin levels and 30-day mortality among patients undergoing noncardiac surgery." *JAMA* 307.21 (2012): 2295-2304.

Green, S. "The importance of cognitive and behavioral factors in the experience and maintenance of menopausal symptoms." *Menopause* 18.11 (2011): 1154.

Larché, M. et al. "Development and preliminary clinical evaluation of a peptide immunotherapy vaccine for cat allergy." *Journal of Allergy and Clinical Immunology* 127.1 (2011): 89-97.

Lee, C., et al. "Fecal Transplant via Retention Enema for Refractory or Recurrent *Clostridium difficile* Infection." *Archives of internal medicine* 172.2 (2012): 191.

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Szpirt, W. M., J. G. Heaf, and J. Petersen. "Plasma exchange for induction and cyclosporine A for maintenance of remission in Wegener's granulomatosis—a clinical randomized controlled trial." *Nephrology Dialysis Transplantation* 26.1 (2011): 206-213.

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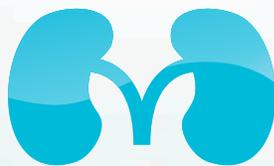


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St. Joseph's Healthcare Hamilton is a premier academic and research health care organization located in Hamilton, Ontario.

For over 123 years, SJHH has cared for the community with the utmost compassion, cutting-edge innovation, and steadfast commitment.

As a result, our institution makes a difference in many patients' lives and continues to move forward on the path towards better patient care.

Affiliated with McMaster University, Mohawk College, and the St. Joseph's Health System.