my ST. JOSEPH'S

SPECIAL RESEARCH EDITION FALL 2024

A publication of St. Joseph's Health Care London

Nature's Healing Power

Using virtual technology, St. Joseph's Health Care London is bringing the outdoors in for forensic mental health care patients.

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Fall 2024 | Issue 10

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MY ST. JOSEPH'S IS

St. Joseph's Hospital	Parkwood Institute
Mount Hope Centre for Long Term Care	Southwest Centre for Forensic Mental Health Care
Lawson Research Institute	Teams, clinics and programs in our community and beyond.

Imagination to innovation

At St. Joseph's Health Care London (St. Joseph's), we're proud of our illustrious legacy of discovery and our culture of innovation.

Every day, we work to transform imagination to innovation to impact.

Now, we are building a future of even more "firsts," more breakthroughs – and even greater patient impact.

Recently, our relentless quest for new knowledge leaped forward with the launch of our re-envisioned Lawson Research Institute – the research arm of St. Joseph's. We are redefining the landscape of research across our organization to advance discovery in our unique areas of expertise: precision imaging, aging, mobility and activity, surgery, chronic disease and mental health.

In each research space, in every care area and in all the critical questions we ask, we drive to ensure health care meets the diverse needs of our community.

It's about rigorous research that generates a better understanding of the human body. And, ultimately, it's about mobilizing our individual and collective efforts to improve patient health and health systems.

At St. Joseph's, highly expert individuals and teams are making a difference – with ingenuity, curiosity, creativity, persistence and a commitment to collaboration and diverse perspectives.

On these pages, we provide you with a glimpse of their cutting-edge pursuits and just what it means for our patients and health care globally.

As you will see, Lawson leads health research. Join us as Lawson, and all of us at St. Joseph's, chart an ambitious new course in discovery and the delivery of care.

Roy Butler, PhD
President and CEO, St. Joseph's Health Care London

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COVER STORY

Changing our MINDS

Local youth use art and storytelling to illustrate the personal and system challenges in mental health.

Dr. Arlene MacDougall, Mental Health Lead at Lawson Research Institute, Director of Research and Innovation with St. Joseph's Mental Health Care Program.

The words and images are both heartbreaking and hopeful.

Zine-writing, a personal and introspective medium often used by people who have been marginalized, is an important part of local research that is finding solutions to complex mental health challenges among young adults. Its name derives from its magazine ("zine") format.

"When we make the voices of people with lived experience central to our research, we can learn from each other and then change the system together," says Dr. Arlene MacDougall, founder of MINDS of London-Middlesex.

The social innovation and research lab based at St. Joseph's Health Care London (St. Joseph's) is dedicated to designing, piloting and testing mental health innovations for teens and young adults. Its recent evolution into MINDS 2.0 adds insights by and for people up to age 35 who have complex, pervasive mental health and addiction issues.

Learning from experts

Rin, a London artist who has published independent zines for a decade, created three for this project, including one that, with irony, asks the reader to ponder which vulnerable people aren't worth saving.

"I believe making art can be very healing," says Rin. "I wanted to share some of my story to help myself and help others. I want to play a part in shaping a mental health system that's better than the one I encountered."

Local artist Rin Vanderhaeghe (right), a seasoned zine publisher, collaborates with youth to create zines addressing mental health challenges through art and storytelling. Dr. Arlene MacDougall (middle), founder of MINDS of London-Middlesex and key researcher at Lawson Research Institute, leads efforts to transform mental health systems, supported by Melissa Taylor-Gates (left), Associate Director of Innovation and Engagement at MINDS.

The zines weave art, prose and poetry into story:

- *3 things I would change: affordability, stigma, waitlists.*
- *"If I had a magic wand, I would use it to heal the waters, grow the trees, foster animal growth."*
- *Look in the mirror, see how far you've come.*

They also raise and propose solutions to troubling issues among people with mental illness: housing and homelessness, sparse resources for people with addictions, lack of coordination among service providers, and dehumanizing attitudes in health and criminal justice systems.

"Participants experienced catharsis just in telling their stories," says Renee Hunt, PhD, Associate Director of Research and Operations at MINDS. "And because they're the experts, they're also playing an important part in changing systems that need an overhaul."

Adds Rin, "It feels empowering knowing people are listening to us – people who care and are committed to making change to the system."

MacDougall notes the pivotal role of St. Joseph's Health Care Foundation – in particular, a ground-breaking $5-million donation towards mental health research from philanthropist Ryan Finch – in advancing mental health innovation through MINDS and MINDS 2.0.

"They've been our biggest supporters since day one. This wouldn't have happened without support from Ryan and the foundation and all the many donors who believe in mental health research," says MacDougall, who is also Director of Research and Innovation with St. Joseph's Mental Health Care Program.

"MINDS has been a catalyst for system change," MacDougall adds. "Research is always about finding answers and generating impact."

Many findings from MINDS research have been put into practice, among them are the creation of guidebooks for peer support, free taxi service for rural youth needing urban mental health or addiction services, and educational resources to support 2SLGBTQI+ students.

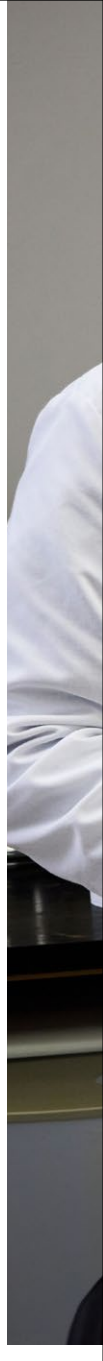
MacDougall says MINDS 2.0 expands that work with new voices and the exploration of more in-depth solutions.

What's next for MINDS 2.0

- **Workshopping ideas and prototypes for mental health systems change**. Sessions will be held where people with lived/living experience and service providers propose and develop potential solutions.
- **Leadership-building.** Twenty mental health practitioners will be trained to become "agents of change" who will collectively create, implement and evaluate mental health programs, technology, interventions and training.
- **'Imaginarium' conference.** In 2025, a first-of-its-kind national conference will take place to share system innovations in mental health and addiction.

Capturing bacteria's grand ballet

In a world first, scientists at Lawson Research Institute are using imaging technology to see and track microbes and provide an unprecedented glimpse of the human microbiome.

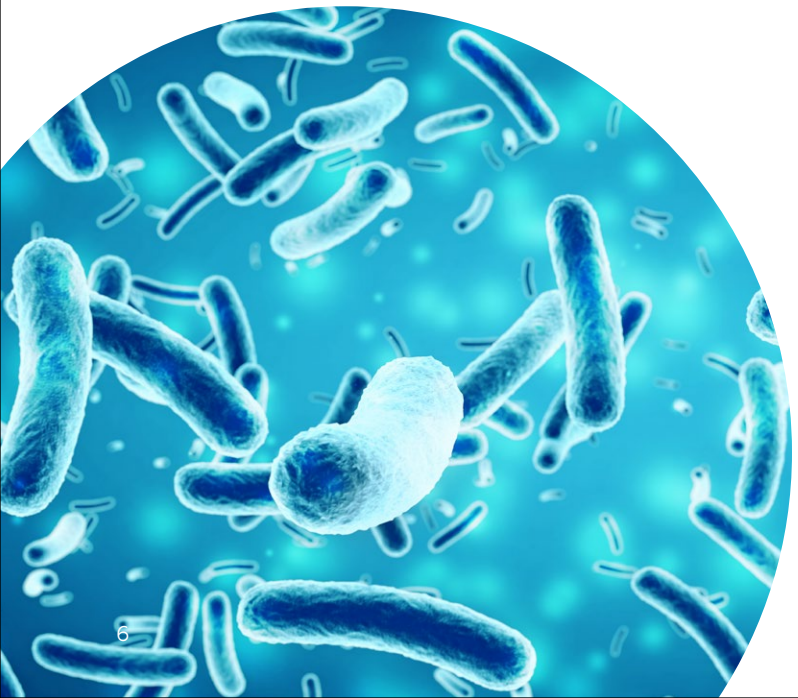


Within each of us is a world populated by a bustling metropolis of microorganisms – a tapestry of trillions in a delicate dance to balance health, well-being and vitality.

Far outnumbering human cells, this dynamic ecosystem of busy bacteria, industrious fungi and elusive viruses is the body's microbiome. This invisible hive of ceaseless activity is so intrinsic to human health, its explorers say it should perhaps be considered an organ in its own right.

Now, in a world first, Lawson Health Research scientists studying this microcosmic underworld are making the invisible visible – in real time.

The team of Jeremy Burton, PhD, Research Chair of Human Microbiome and Probiotics and Director of the Canadian Centre for Human Microbiome and Probiotic Research at St. Joseph's Health Care London (St. Joseph's), is using imaging technology to see and track microbes, providing a perspective never before achieved.



"Typically, we track microbes by analyzing samples from patients after treatment to improve their gut health with probiotics or microbiota transplantation (FMT)," explains Burton, whose endowed research chair is funded through St. Joseph's Health Care Foundation. "While we can get detailed information through DNA sequencing techniques, this often takes many months and relies on collecting fecal samples and other samples that may not be easily obtained. It also doesn't provide all the information we need, like exactly where the microbes have travelled and how long they live."

'Fantastic insight'

Imaging the microbes allows the Lawson team "to see things in real-time and not worry about clinical samples," he adds.

Donna Goldhawk, PhD, molecular imaging scientist with Lawson's Imaging Research Program, explains that imaging is done by attaching a radioactive tracer to cells, such as bacteria, that can be ingested and visualized in the body with positron emission tomography-magnetic resonance imaging (PET/MRI).

Imagine it as a biological version of an AirTag that tracks specific microbes.

"It's through this pipeline that we gain fantastic insight into how the microbiome supports human health," she says.

As an example, tracking microbes allows the scientists to see if they are close to or crossing over the gut cell wall.

At St. Joseph's Health Care London, researchers are world leaders in using imaging technology to see and track microbes of the human microbiome – in real time.

Jeremy Burton, PhD, Director of the Canadian Centre for Human Microbiome and Probiotic Research, and colleague Shannon Seney, are part of a renowned team at St. Joseph's Health Care London exploring the intricacies of the human microbiome and its role in health and well-being.

"This is critical information because the proximity of microbes to the cell wall will likely determine if the probiotic or FMT therapy is effective or not," says Burton. "We can now potentially track microbes that we administer to people in real-time and, in the future, be able to tell how sick people are and if they have a dysfunctional microbiota. Eventually, this information will be linked to their other health information for a complete picture."

Uniquely St. Joseph's

He notes the work "could only happen here" at St. Joseph's, with its leading-edge imaging, production of novel tracers (isotopes) within Lawson's Cyclotron & PET Radiochemistry Facility, and with world-class collaborative expertise – all fueled by the generosity of donors.

Working with Burton and Goldhawk are Lawson scientists, Michael Kovacs, PhD, Frank Prato, PhD, Dr. Michael Silverman, Seema Nair Parvathy, PhD, and Neil Gelman, PhD.

"This exciting work illustrates how innovative technologies can emerge when diverse groups collaborate closely in a multi-disciplinary approach to research within a hospital setting," says Michael Kovacs, Program Lead, Lawson's Imaging Research Program, and Lead, Cyclotron & PET Radiochemistry Facility. "Lawson's environment has been a catalyst for new ideas, collaborations and many Canadian firsts."

The potential impact cannot be overstated, adds Burton.

"This is the pathway to revolutionizing the way we understand the microbiome in people," he says. "We've spent so long trying to eradicate microbes and studying the ones that cause ill health. Only relatively recently have we begun to study the ones that cause good health. That's a dramatic shift in approach and, while we've come a long way, we're really only getting started."

> The cyclotron facility is a hub for Southwestern Ontario, uncovering the possibilities for improving patient care in numerous ways.
>
> – MICHAEL KOVACS, PhD

ILLUMINATING
the body's smallest secrets

Lawson Research Institute's cyclotron facility
is a formidable partner in the fight against disease.

Tucked behind the protective lower walls of St. Joseph's Hospital lies a futuristic workshop of sorts – a place where science, technology and leading-edge medical care converge.

Within a behemoth, 56-tonne machine, a swirling vortex of powerful magnetic fields and electric pulses is creating bursts of radioactive isotopes – tiny, potent sparks of life-saving potential. In the hands of technologists, researchers and clinicians, these chemical elements become diagnostic tracers and therapeutic agents, each particle revealing secrets of the human body.

The machine is a cyclotron - a type of particle accelerator and the only one of its kind in the region. At Lawson Research Institute's Cyclotron & PET Radiochemistry Facility, scientists are producing a steady and timely supply of short-lived radioisotopes every day to study, detect and treat disease.

These radioisotopes become a beacon in positron emission tomography (PET) scans, illuminating the hidden shadows of cancer and other diseases. Others provide a precise map of the intricate pathways of blood flow, biological functions, location of specific cells and proteins, and the body's skeletal architecture.

A formidable partner in the fight against disease, "the cyclotron facility is a hub for Southwestern Ontario that is uncovering the possibilities for improving patient care in numerous ways," says Michael Kovacs, PhD, Lead, Lawson's Cyclotron & PET Radiochemistry Facility and Program Lead, Lawson Imaging Research Program.

St. Joseph's Health Care London's cyclotron supports a wide variety of research projects including imaging applied to oncology, cardiology, neurology, psychiatry, metabolic disease, infectious diseases, bioelectromagnetics and other areas.

"The scope of discoveries already making a difference, and the possibilities within reach, are a source of great pride for Lawson and for London," adds Frank Prato, PhD, Lawson scientist and Chief Medical Physicist at St. Joseph's.

For Kovacs, Prato, their teams and partners, St. Joseph's cyclotron is a testament to ingenuity and innovation, a world where every spin and burst of charged particles brings a promise of hope and healing.

Powering Innovation

Generous donors to St. Joseph's Health Care London have made both advanced research and next-level technology a reality. During the past few years, more than $1.1 million in donations funded extensive renovations to the Cyclotron & PET Radiochemistry Facility, making it possible to increase production of isotopes and expand life-saving care.

Recently, $1 million in donations supported a new PET/CT – the heart of Canada's first national GE centre of excellence in molecular imaging and theranostics being developed at St. Joseph's Hospital.

Poop in a pill helping **ADVANCE CANCER CARE**

Lawson Research Institute scientists have perfected the delivery of fecal transplants via patient-friendly capsules now central in ground-breaking cancer treatment studies.

It's one of the most exciting areas of research in cancer care.

Making waves in scientific and health care circles worldwide, it holds the potent potential to "jazz up" cells that attack cancer and boost the body's response to treatment.

So what is this powerful ally? It's poop in a pill – home-grown right here at St. Joseph's Health Care London and Lawson Research Institute.

In fact, Lawson scientists Dr. Michael Silverman, Seema Nair Parvathy, PhD and their team are considered poop pill pioneers, having perfected the delivery of fecal transplantation by way of patient-friendly capsules that can be easily swallowed. These capsules contain healthy gut microbes that have become pivotal in many landmark cancer treatment studies.

Triggering an immune response

Understanding the role of poop in cancer treatment requires grasping the wonders of the human microbiome and its key role in influencing health and well-being.

The human microbiome consists of trillions of microorganisms that live inside and outside of the body, including bacteria, viruses and yeasts. While some bacteria are associated with disease, others are vital to the human immune system – the body's main protective and disease-fighting tool – and many other aspects of health.

The goal of fecal microbiota transplants (FMT) is to transfer healthy gut microbes from donors into patients with cancer and other diseases so that healthy bacteria will colonize in the patient's gut and improve the microbiome, explains Silverman, Medical Director of St. Joseph's Infectious Diseases Care Program and citywide Chief of Infectious Diseases for London's hospitals.

The team of Dr. Michael Silverman, left, and Seema Nair Parvathy, PhD, are poop pill pioneers having perfected the delivery of fecal transplantation by way of patient-friendly capsules.

To do so, stools are collected from carefully screened healthy donors, prepared in a lab into capsule format, and introduced into a patient's gastrointestinal tract.

"What is so exciting is the evidence we now have showing how a healthy microbiome activates the immune response to tumours to make the treatment more effective," Silverman adds. "It allows us to harness the immune system to mount a stronger defense."

St. Joseph's capsules are central to several significant studies currently underway aimed at improving treatment for lung, kidney, breast, renal, pancreatic and other cancers.

Among the most notable is the London team's lead role in one of the world's largest clinical trials using FMT to improve the effectiveness of the standard of care for advanced melanoma, a type of skin cancer.

Improving melanoma survival rates

The 16-site Canadian trial builds off the work of Silverman, Parvathy and their team, in partnership with Saman Maleki, PhD, and Dr. John Lenehan at London Health Sciences Centre. Together, they were the first to demonstrate the safety and therapeutic potential of using the capsules produced at St. Joseph's to influence a patient's gut microbiota to enhance immunotherapy and increase the odds of surviving advanced melanoma.

"London is seen as having the most expertise in use of FMT in cancer care in the world and is a driving force in moving this forward," says Silverman. "Immunotherapy is rapidly expanding the number of treatable cancers and our FMT therapy is helping to accelerate this progress."

Lawson Research Institute scientist Seema Nair Parvathy, PhD, holds up the patient-friendly capsules developed at St. Joseph's Health Care London that have made it possible to easily perform fecal transplantation.

Cultivating *eureka* moments

Discovery should be 'everyone, everywhere,' says Lawson Research Institute Scientific Director Lisa Porter.

> Excellence doesn't mean we have all the answers. It means we're continuously striving to be better. It means we're asking questions that can drive better health care – not just for the patients we serve, but for national and global impact, too.
>
> – LISA PORTER, PhD, SCIENTIFIC DIRECTOR AT LAWSON RESEARCH INSTITUTE

Lisa Porter believes excellence in health research is a continuum of inquiry, inspiration, innovation and improved patient care.

That's why she is so energized by the promise and potential of Lawson Research Institute (Lawson) at St. Joseph's Health Care London (St. Joseph's), where she is Scientific Director and Vice President of Research.

"Discovery comes from exploring great questions. You can't have a 'eureka' moment without asking why things work, or don't work – and that's what we do so well here at St. Joseph's," says Porter.

A distinguished scientist herself with a passion for asking those probing questions, Porter leads strategic planning for research across the organization. Her vision includes growing the rich culture of research in several specialty pillars, while also reinforcing direct links between scientific inquiry and patient health.

"There's data to show that patients who are treated in research-intensive hospitals live longer. That's not just patients in clinical trials who benefit; that's all patients who live longer," she notes.

Other elements of her vision for Lawson include elevating data sharing and research support, expanding training opportunities for young researchers, growing grant support, strengthening collaboration and partnerships, and building relationships and reputation.

"I love that excellence is one of the values of St. Joseph's. Excellence doesn't mean we have all the answers. It means we're continuously striving to be better. It means we're asking questions that can drive better health care – not just for the patients we serve, but for national and global impact, too."

Porter comes from a family of knowledge-seekers and problem-solvers. Her father repaired electronics and was an avid inventor. Her mother prepared income tax returns, self-taught with meticulous attention to detail. They ignited in her a curiosity that continued through her undergraduate studies in biology and pharmacology, her graduate and postdoctoral work, and her research as a cancer scientist at University of Windsor and founding director of its WE-SPARK Health Research Institute.

Now at Lawson, she wants to encourage, inspire and spotlight the innovative work of researchers, scientists, clinicians and students who are passionate about improving health.

"I want research to be everyone, everywhere," she says. "We need hospitals, industry, people with lived experience, and policy makers coming into the fray. It can't be just the researcher, the scientist. It's about having champions embedded in all walks of life, from first line of care to people who can influence systemic change. It's a messy piece, but it's also how we fulfil this bigger mission to help everyone who comes to us for health care."

Known for its use in treating mental illness, the repetitive transcranial magnetic stimulation (rTMS) device uses a series of short magnetic pulses directed to the brain to stimulate nerve cells. A team of scientists at Lawson Research Institute are bridging the gap between neuroscience and rehabilitation using the rTMS to map pathways between the brain and the body.

Revolutionizing rehab

St. Joseph's Health Care London is taking giant strides in the science of rehabilitation and movement, with direct benefit to patients.

St. Joseph's is setting a long-time vision into motion.

"Five years ago, we had a vision of leveraging our long history and expertise in providing innovative rehabilitation treatments to improve the lives of people with mobility needs on a larger scale," says Roy Butler, President and CEO of St. Joseph's Health Care London (St. Joseph's). "That dream has come to life."

While experts at St. Joseph's had the knowledge, innovative spirit and passion to achieve the vision, they needed a partner who shared the same enthusiasm.

William (Bill) and Lynne Gray answered that call. With their generosity and ground-breaking investment, The Gray Centre for Mobility and Activity was created.

"Lynne and I are very pleased with the steady forward advancement of the centre's mission since its establishment just a few short years ago," says Bill Gray. "The innovative thinking and idea generation that seeks new solutions to the issue of mobility have really taken root. We hoped that The Gray Centre would have an impact on care ... and it has."

"We've watched the development of The Gray Centre with enormous pride and are pleased to have our name associated with it, and the excellence it stands for," adds Lynne Gray.

A unique concept

Established in 2020, The Gray Centre at St. Joseph's Parkwood Institute is a regional hub focused on researching leading-edge treatments and interventions in mobility and activity. The centre's unique model of linking research and care allows researchers to work side-by-side with clinicians, patients and caregivers to uncover optimal methods for maintaining mobility throughout a person's life.

"Scientists at The Gray Centre are leading the way in integrating technology and solutions in care to better understand how we can enhance each patient's treatment plan to improve their functionality and ability to move," says Butler.

Continued next page...

> The innovative thinking and idea generation that seeks new solutions to the issue of mobility have really taken root. We hoped that The Gray Centre would have an impact on care... and it has.
>
> – BILL GRAY

Driven by innovative research, Siobhan Schabrun, PhD, and her team at St. Joseph's Health Care London are exploring non-invasive brain stimulation techniques to promote neuroplasticity, aiming to transform pain management and improve patients' mobility and activity levels.

Using the latest in cutting-edge technology like the Hocoma Lokomat, Lawson Research Institute scientists are studying how the body moves after a catastrophic injury and developing new methods of rehabilitation.

Pioneering Research

More than 50 ongoing rehabilitation research projects at Parkwood Institute are exploring areas such as spinal cord and traumatic brain injury rehabilitation, pain, outcomes for amputees, virtual exercise and cognitive behavioral therapy, gait analysis as a measure of dementia progression, and stroke rehabilitation and recovery.

The Gray Centre is a catalyst and connector for these projects by investing in cutting-edge technology, providing seed grants, embedding researchers from Western University, leveraging clinical expertise, attracting world-class researchers and translating new knowledge into clinical practice by training students and clinicians, and fostering sustainable practice change.

More than $1.3 million granted through St. Joseph's Health Care Foundation has advanced work at The Gray Centre over the past year. From researcher support to new equipment such as two transcranial magnetic stimulators, a portable handheld ultrasound and several sensored mats for gait assessment, donors have stepped up to accelerate this work.

Leadership with Purpose

At the helm of The Gray Centre is Siobhan Schabrun, PhD, a world-renowned neuroscientist and the inaugural William and Lynne Gray Research Chair in Mobility and Activity. Thanks to a partnership with Western University's Faculty of Health Sciences and Schulich School of Medicine & Dentistry, donor funding for the chair made through the foundation was matched, creating a $5-million endowed position.

Schabrun's innovative research benefits people suffering from chronic pain. With a focus on non-invasive brain stimulation techniques to enhance neuroplasticity and improve mobility and activity outcomes, she and her team are, in essence, retraining the brain's pain response. This leading-edge work bridges the gap between neuroscience and rehabilitation, offering new hope for individuals with musculoskeletal and neurological conditions.

Originally trained as a physiotherapist with a PhD in neuroscience from the University of Adelaide in Australia, Schabrun has attracted more than $15 million in competitive research funding and written or contributed to more than 140 scholarly publications.

FLOATing Forwards

The newest advancement is a first-in-Canada and a marvel of medical engineering that is transforming options in rehabilitation research and practice.

The Reha-Stim Medtec FLOAT system at St. Joseph's Parkwood Institute enables patients with mobility limitations to walk, supported, without fear of falling. They "float" in a controlled environment using a combination of robotics, body-weight support and real-time feedback. The device has a harness attached to a robotic arm, which adjusts the level of support based on the patient's movements. Sensors provide continuous feedback for maximum learning and greatest benefit to physical therapists and patients alike. The FLOAT system has shown significant improvements in patients' mobility, balance and overall functional independence.

"Innovative equipment like the new FLOAT System is an example of the type of innovation that does not exist anywhere else in Canada," says Bill Gray. "The real-life application of technologies like this are what The Gray Centre is intended to be about."

Through the combined efforts of dedicated professionals, cutting-edge technology and philanthropist partners, St. Joseph's Gray Centre has combined vision with passion and is transforming lives, one step at a time.

$5 million
IN NEW GRANT MONEY TOWARDS RESEARCH

60
RESEARCH PROJECTS

39
TRAINEES

22
STAFF

10
AWARDS IN 2023-2024

Discovery-driven,

At Lawson Research Institute, medical discoveries are transforming lives and communities.

As the research arm and integral partner of St. Joseph's Health Care London, Lawson Research Institute (Lawson) is one of Canada's premier health institutes. For more than 40 years, a culture of curiosity and innovation has propelled Lawson to become a renowned leader in work that improves the lives of people here and around the world.

Lawson's 250 scientists and associate scientists – along with hundreds of staff members, physicians, students, patients, donors, and academic and funding partners – are moving the needle in local and global health care. Closely integrated with collaborative groups across Canada, North America and in dozens of countries around the world, Lawson researchers know what it takes to make a difference. Their expertise and areas of focus are diverse. Their impact is profound.

Imaging

Lawson is at the international forefront of medical imaging – research that takes a deep look inside the human body and seeks to understand how tissues, bones, organs and cells work, and then guides next steps when the body doesn't work as it should.

Lawson's award-winning imaging scientists, trainees and staff push the boundaries of the latest in technology, which has led to a host of Canadian and world firsts in new pathways of diagnosis, treatment and care.

Quite simply, Lawson scientists see things more clearly than anyone else.

Mobility and Activity

Lawson researchers are dedicated to discovery that benefits people whose lives have been upended by spinal cord injuries, stroke, brain injuries, chronic pain, accidents, falls, trauma or degenerative disease. At The Gray Centre for Mobility and Activity within St. Joseph's Parkwood Institute, this exciting research is translated into practice.

Lawson mobility researchers comprise one of the largest and most accomplished teams in the country and their work is transformative - helping people around the world lead active and healthy lives.

patient-focused

Mental Health

Lawson experts are searching for answers to persistent mental disorders experienced by youth across the life span to older adults. They do so by taking a science-based, people-driven and systems-focused approach through neuroscience, interdisciplinary clinical practice, pharmacology, psychotherapy, neurostimulation and novel therapeutics, digital technology, partnerships and policy change.

Forging partnerships unique in depth and breadth, Lawson's mental health researchers have an unwavering commitment to better mental health for all.

Surgical Research

Every patient of the renowned Roth|McFarlane Hand and Upper Limb Centre at St. Joseph's Hospital has benefited from research performed at Lawson. Behind the scenes of every breast care and urology procedure and each sight-saving treatment at the Ivey Eye Institute is a team of researchers whose curiosity and innovation are setting global standards of excellence.

Lawson scientists lead the way in exploring new surgical procedures, techniques, devices and medications, initiating clinical trials that inform surgical education, and improving surgical practices around the world.

Endocrinology, Metabolism and Chronic Diseases

We don't think of chronic illness until it finds us. But for specialized Lawson research teams, solving complex chronic illness is always front of mind.

Lawson's scientists are building upon a legacy of leadership in diabetes and endocrine research, testing new and better ways to treat debilitating arthritis, cultivating breakthrough science in probiotics and gut health, and catching the world's attention by boosting the body's immune system with poop – or fecal microbial transplants in scientific terms. Their goal? Discovering the deepest roots of what makes us ill and, equally importantly, what makes and keeps us healthy.

Aging

Helping people live more independent lives, and halting the rising toll of dementia, is the focus of a determined team of world-class experts at Lawson. They are seeking earlier, faster ways to diagnose and predict neurodegenerative diseases, and testing new medications that could delay or slow cognitive impairment. They explore the links between cognition and mobility, osteoporosis and bone health, falls and frailty, and they translate their findings into care.

By integrating groundbreaking science with clinical practice, Lawson is at the forefront nationally and globally of research into aging-related diseases.

Nature's *Healing* Power

Giuseppe Gazzellone, clinical extern, occupational therapy, demonstrates the eco-virtual reality experience available to patients at Southwest Centre for Forensic Mental Health Care.

Using virtual technology, St. Joseph's Health Care London is bringing the outdoors in for forensic mental health care patients.

Imagine sitting on a white sandy beach in a tropical location. The sun warms your face and a gentle breeze ripples across the water when, out of the corner of your eye, you spot a sea turtle slowly and curiously approaching.

You turn your gaze towards this beautiful creature and watch in wonder. You've never seen a sea turtle up close before.

For some, this type of experience is part of a dream vacation, attainable with enough money or imagination. But for many patients at St. Joseph's Health Care London's Southwest Centre for Forensic Mental Health Care (Southwest Centre) – including those not yet well enough to leave the facility – a new virtual-reality connection to nature offers a missing link in their journey towards recovery.

Immersive experiences in nature have been linked to positive mental health outcomes and a healthier sense of self – a benefit that staff researchers at Southwest Centre call eco-spirituality.

Restorative experience

Occupational therapists Jared Scott and Clark Heard, and spiritual care practitioner Stephen Yeo, have explored just what this means for patients. Through a novel study published in 2022, Southwest Centre patients were provided with opportunities to become immersed in nature in the community, with tremendous therapeutic results.

The patients experienced a stronger connection with nature, a chance for open reflection and relaxation, and a restorative experience that provided a sense of peace and personal significance.

The research team wondered if these experiences could be replicated in a virtual reality (VR) environment for patients who aren't yet able to leave the facility.

"We realized we can translate these types of experiences through VR goggles where the patient has the ability to make their choices on how to engage," says Heard. "This enables someone to experience something that's a little harder to touch in real life."

For example, if the patient wishes to sit and reflect on a beach, they can. If they wish to be immersed in the jungle and experience giraffes and elephants walking among them, the choice is theirs.

"There's something very human about connecting with, or in, nature," adds Yeo. "True, virtual reality is not the same as the real thing, but we believe it offers a sense of connectedness, whether to creativity, to beauty or the transcendent. We see how it enlivens patients, even in sometimes very simple, subtle ways."

Heard believes this type of immersive experience nurtures the innate intellectual curiosity present in everyone.

"The first time people try it and look over their shoulder, they realize it's a full 360-degree experience. They look above and there are birds flying over them the same as anywhere else," he explains.

Ultimately, Heard and Yeo believe the power and innovative experience of eco-VR is encouraging discovery in patients, energizing them at an intellectual and spiritual level.

> True, virtual reality is not the same as the real thing, but we believe it offers a sense of connectedness, whether to creativity, to beauty or the transcendent.
>
> – STEPHEN YEO

With the purchase of VR equipment made possible through community support from donors to St. Joseph's Health Care Foundation, the team has embarked on an eco-VR study, looking at what patients experience via VR and how that participation impacts their care journey. They are exploring with patients whether VR immersion in nature helps them cope with being in hospital at a difficult time in their lives.

Far beyond forensic mental health care, the answer just may open the door to a world out of reach for many others receiving care in various settings.

Keeping an eye on ***care of the future***

Dr. Khaldon Abbas is using his curiosity and passion for ophthalmology to improve patient care and outcomes for people with eye diseases and disorders.

While in university, Dr. Khaldon Abbas had a deeply moving experience as a volunteer with the Canadian Centre for Victims of Torture (CCVT) that changed the trajectory of his life and career.

The community-based organization helps victims of war and torture, and Abbas, whose family immigrated to Canada from Iraq a little more than a decade before, wanted to share his skills as a translator and tutor with newcomers.

"I came to Canada when I was 12. I had limited English, we had no family or friends here, and it was really hard to acclimate," says Abbas. "I wanted to give back to the community and to be there for immigrant families who were facing similar challenges that my family had to deal with."

During one shift with CCVT, Abbas was paired with a family from Syria, whose nine-year old daughter was losing her eyesight. She was living with retinal dystrophy, a degenerative disorder that can progress to complete blindness.

Witnessing the impact the eye disorder had on the young girl and her family inspired Abbas to further his own education and set a goal to become an ophthalmologist.

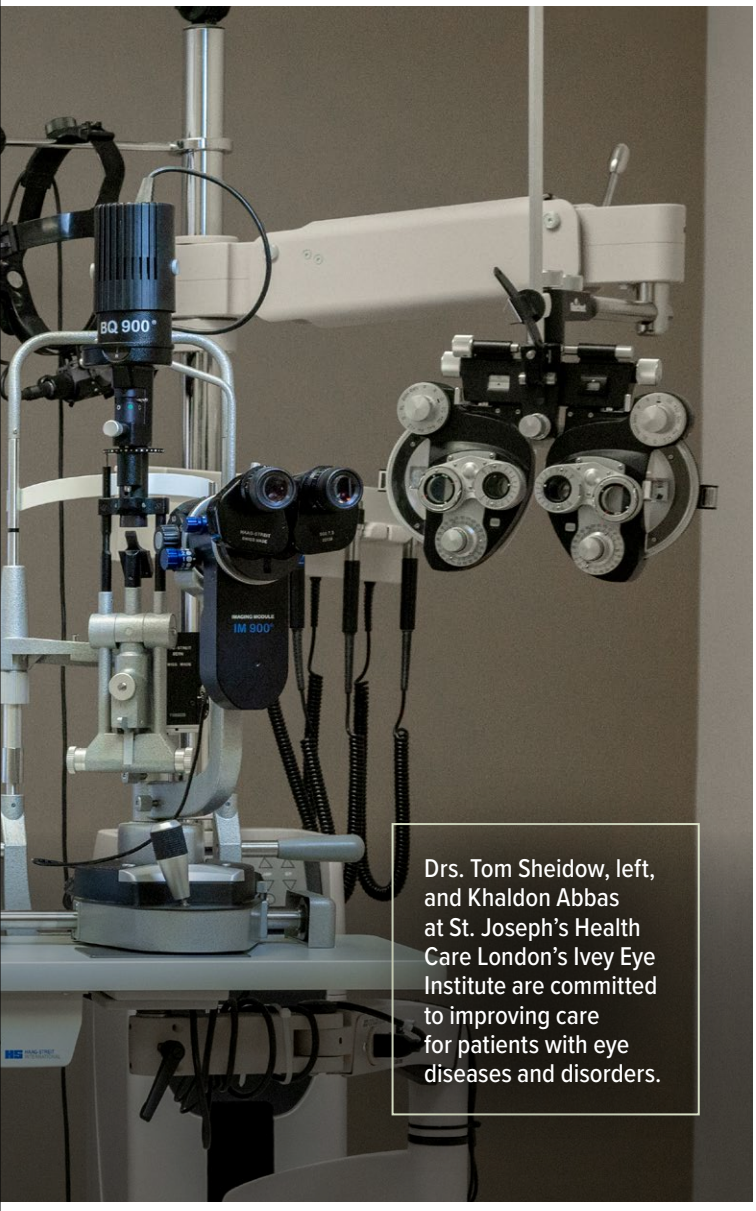
That was eight years ago. Since then, Abbas spent several years working as a clinical research coordinator and completed four years of medical school at the University of British Columbia.

Today, he is a clinical research fellow at the Ivey Eye Institute of St. Joseph's Health Care London (St. Joseph's) – a position supported through St. Joseph's Health Care Foundation thanks to the generosity of donors.

During the next year, Abbas' research will focus on improving patient care and outcomes for people with eye diseases and disorders.

Drs. Phil Hooper, Verena Juncal and Tom Sheidow, all retinal surgeons at Ivey Eye, are the impetus behind the fellowship and now serve as Abbas' mentors. Through the fellowship, the trio wanted to expand their clinical research program, which is heavily focused on clinical trials. Their goal was to delve into quality improvement projects and explore, among other things, patient data, referral patterns and wait times – information that could guide Ivey Eye in refining care and better understand how to improve the overall flow of patient care.

> I wanted to give back to the community and to be there for immigrant families who were facing similar challenges that my family had to deal with.
>
> – DR. KHALDON ABBAS



Drs. Tom Sheidow, left, and Khaldon Abbas at St. Joseph's Health Care London's Ivey Eye Institute are committed to improving care for patients with eye diseases and disorders.

As surgeons at the largest single-site eye care centre in Canada committed to innovative care, the Ivey Eye physician leaders felt a responsibility to make this work a reality.

"We started talking about this about three years ago," says Sheidow. "We were familiar with similar roles at other academic eye care centres and we were fortunate to have some funding, so we brought the idea to the foundation and started to craft the terms of reference," he adds.

Abbas is the second physician in this fellowship, following in the footsteps of Dr. Amy Basilious, who is now in her second year of residency at Ivey Eye.

"Amy did an exceptional job as our inaugural fellow and we were looking for someone with similar characteristics – bright, curious, motivated, a self-starter and a passion for ophthalmology," says Sheidow. "Khaldon has all of that and more," he adds, referring to Abbas' interest and background in clinical trial work.

Even before arriving in London for the fellowship, Abbas began working with his new team to generate research project ideas and shape a research plan. Among the projects he will tackle is one that will assess the effectiveness and complications of lens exchange surgeries, and another in collaboration with Basilious focused on macular hole repairs.

He will also spearhead two quality improvement studies aimed at streamlining the referral process to Ivey Eye for optometrists and enhancing education and information resources for patients with eye diseases and disorders. Through his work, Abbas is excited to build his research skills, forge new professional connections and see some of his research translated into tangible improvements in patient care.

He's grateful to Hooper, Juncal and Sheidow, along with St. Joseph's and the foundation, for their vision and spirit of innovation in establishing the fellowship.

"Everyone has been extremely welcoming and supportive of me, especially my mentors and fellow co-workers," he says. "There's a real family environment at St. Joseph's. I feel like this is my new home away from home."

Dementia Research *hits the 'mark'*

St. Joseph's Health Care London is at the forefront of national research exploring biomarkers to better predict dementia and slow its onset.

Dr. Michael Borrie is now seeing grandchildren of patients who came to his clinic when he first started Alzheimer's research 30 years ago. His message to this new generation is more hopeful than ever, bolstered by ever-more-reliable ways of early detection and being tantalizingly close to a future of predicting dementia and intervening even before symptoms appear.

"The ultimate goal is to slow cognitive decline – and to stop it if we can – so that people can live independently, and happier, for a lot longer," says Borrie, Medical Director of the Aging Brain and Memory Clinic at St. Joseph's Health Care London (St. Joseph's).

"We're aiming to alter the trajectory of dementia," he says.

A geriatrician, clinician and researcher, Borrie is also Platform Lead for the Comprehensive Assessment of Neurodegeneration and Dementia (COMPASS-ND), a long-term study within the Canadian Consortium on Neurodegeneration and Aging (CCNA).

Recently, the Canadian Institutes of Health Research announced $20.6 million in funding to continue the work of CCNA, a 30-site, multi-pronged project of which the St. Joseph's-based team is the lead player. The grant will enable them to advance the frontiers of dementia research to benefit real-world patients here and across the country.

Solving mysteries with biomarkers

Despite the prevalence of Alzheimer's and other neurodegenerative diseases – and with more than 10,000 new diagnoses in Canada each year – there are still many mysteries to solve: Why do some people have early-onset dementia while others, super-agers, remain alert and active in their 90s? What's happening genetically, in their environment and personal medical history to advance or protect against the disease?

What is known, however, is the link between damaged nerve cells and specific proteins that misfold and clump together to form amyloid plaques in the brain. Detecting these abnormal proteins early is an important key to diagnosis and prediction.

Locally, the most comprehensive tool has been state-of-the-art brain positron emission tomography (PET) scanning by the Imaging Program team of Lawson Research Institute (Lawson). Lawson researchers are also involved in reliably detecting amyloid proteins by analyzing participants' cerebrospinal fluid (CSF) – a surprisingly accurate way of confirming imaging results, says geriatrician Dr. Jaspreet Bhangu, a Lawson scientist and head of the biomarker project.

Through the BioMIND regional research project, Lawson scientists are analyzing PET scans, blood and CSF samples to check for specific protein biomarkers. If shown to be reliable, a series of these tests over time could signal whether the disease is progressing, and could predict whether it will progress or respond to treatment.

All that gets added to an arsenal that includes tests of behaviour, memory and cognitive function.

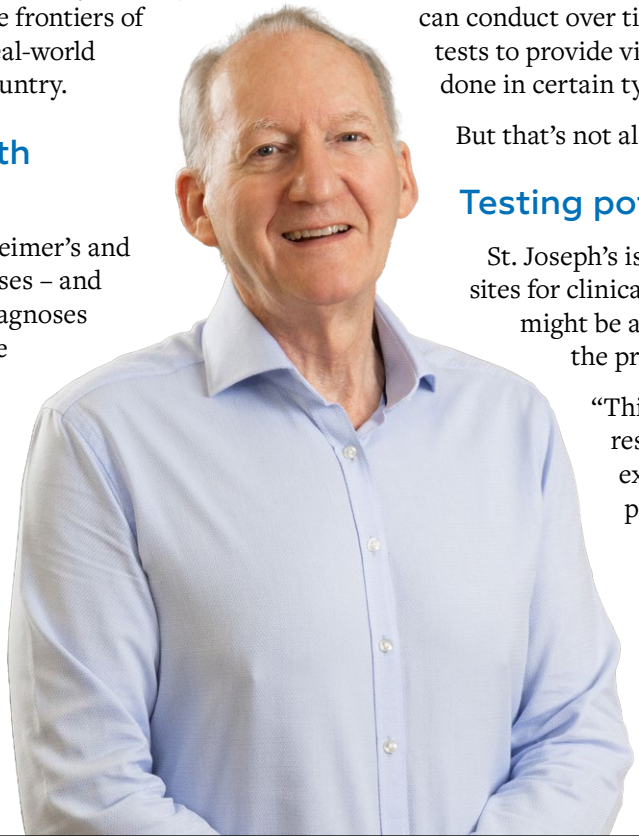
"It's a triple assessment, or even a quadruple one, that we can conduct over time. We hope to use these advanced tests to provide vital information, similar to what is done in certain types of cancer," Bhangu says.

But that's not all.

Testing potential treatments

St. Joseph's is also one of the country's most active sites for clinical trials into whether novel medications might be able to directly pinpoint and destroy the proteins that cause Alzheimer's disease.

"This is the intersection of cutting-edge research, top-notch resources and excellent clinical practice to develop personalized treatments," says Bhangu.



Dr. Michael Borrie leads a team specializing in research into aging, including exploring different biomarkers to assess and predict dementia.

> We are aiming to alter the trajectory of dementia.
>
> – DR. MICHAEL BORRIE

"What makes us unique in Canada among dementia researchers is that our science is taking us from bench to bedside – a rapid turnaround from research to direct patient benefit."

If a person has a strong family history of Alzheimer's disease and no symptoms – but does have positive biomarkers confirming presence of disease – they may then choose to take part in a randomized controlled trial to try to alter the trajectory of the disease.

"It's still in a research context, still in clinical trials – but if Health Canada ultimately approves a treatment, we'll have the ability and the patient database to be able to translate our findings into clinical practice much more quickly instead of waiting for years," says Borrie.

All this is good news for a generation eager for answers, Borrie says.

"When we learn more about the mechanisms of the disease, we can find more effective, earlier treatments. And if we can treat people earlier, we hope to move the disease progression curve to the right, to add more years of good cognitive health to someone's life."

'Dementia doesn't have to be your destiny'

Tackling a "dirty dozen" list of health and lifestyle factors can go a long way in lowering the risk of dementia, say London experts.

Many people could greatly improve their odds against developing dementia by making four low-cost lifestyle changes – today.

In the first study of its kind, researchers at Lawson Research Institute (Lawson) and Western University have found that about half of dementia cases in Canada can be influenced by 12 lifestyle factors.

Topping the list for Canadians are physical inactivity, hearing loss, obesity and hypertension.

The solutions:

- Get off the couch and get moving
- Tackle hearing loss early
- Lose weight
- Get assessed and treated for high blood pressure

"While lifestyle changes aren't a magic pill to prevent all dementias, they're an empowering way to reduce the overall risk," says researcher and study lead author, Surim Son, a PhD candidate at Lawson who works with the dementia research program at St. Joseph's Health Care London (St. Joseph's).

The Public Health Agency of Canada is already highlighting this study as part of its resources for national health policy advisors, she notes.

Four of every five older Canadian adults don't exercise regularly; one in three is obese or has hypertension; and one in five has hearing loss.

"If half of the dementia cases in Canada are linked to modifiable lifestyle risk factors, this suggests that, today, prevention may be the most effective form of treatment," says Dr. Manuel Montero-Odasso, co-author of the paper and Director of the Brain & Gait Lab at St. Joseph's Parkwood Institute.

"Dementia doesn't have to be your destiny, even if that's part of your genetic story. Our results from the SYNERGIC Trial shows almost everyone can change their risk factors and improve their cognitive resilience," says Montero-Odasso, who recently was awarded a $2.4-million federal grant to train students, caregivers and professionals in falls and dementia research and prevention.

The 12 potential modifiable factors (based on a study of 30,000 Canadians over the age of 45), weighted from most significant factor to least:

- Physical inactivity
- Hearing loss
- Obesity
- Hypertension
- Traumatic brain injury
- Depression
- Less education in early life
- Sleep disturbances
- Diabetes
- Smoking
- Excessive alcohol
- Social isolation

INVE$TING *in life-changing research*

Through donor support, endowed research chairs are exploring and answering some of the most profound and complex research questions of our time.

Among cherished family photos and special mementos in the office of Jeremy Burton, PhD, is a slightly faded photo of a young woman. Burton points out the framed photo as he enthusiastically talks about his work. It's a young Miriam Burnett, after whom the Miriam Burnett Chair in Urological Sciences is named. It's also the first endowed research chair position Burton held at St. Joseph's Health Care London (St. Joseph's).

As the research chair for seven years, Burton speaks fondly about the relationship he has with the Burnett family and the crucial role their support has played in advancing his research.

"Thanks to their funding, we became one of the world leaders in urological microbiome research," he says.

Endowed research chairs at St. Joseph's receive consistent and sustainable funding so that research leaders and their teams can answer the most profound and complex health questions of our time.

For decades, donors have been inspired by the clinical research taking place at St. Joseph's and have heavily invested in endowed research chairs. Today, St. Joseph's Health Care Foundation manages seven endowed chairs focused on several areas, including molecular imaging, fetal and newborn growth, and diabetes. Working in partnership with Western University, and with donor support, the foundation recently established four new endowed chairs in mobility, medical biophysics, medical imaging and ophthalmology.

"Medical research in Canada is chronically underfunded, and there is almost no sustainable funding for hospital-based research positions," says Michelle Campbell, President & CEO, St. Joseph's Health Care Foundation. "Private philanthropy has filled that gap for years. When a donor gives to an endowed research chair, they are building capacity in the present day and creating future value and opportunity. An endowed gift has a multiplier effect."

Burton, now the endowed Research Chair in Human Microbiome and Probiotics, has many reasons to be grateful for this support. Not only does the endowed fund pay for Burton's research salary, it also partially supports the salaries of a lab manager and technical team – all vital for a sophisticated lab to be successful.

The funding also provides the gift of time – a diminishing commodity for any busy research team.

Jeremy Burton, PhD, a scientist at Lawson Research Institute, says the stability provided by endowed chairs enables his team to pursue ambitious research initiatives, cultivating an environment where innovative ideas to improve patient care can thrive.

"Scientists need more time to think," says Burton, a Lawson Research Institute (Lawson) scientist. "We are incrementally being stretched in multiple directions, and the funding gives us the time to do what we are meant to do – find answers to important clinical questions and find solutions to medical problems."

Distinguished Lawson scientist and university professor Cheryl Forchuk, PhD, wholeheartedly agrees. She recently completed her final term as The Beryl and Richard Ivey Research Chair in Aging, Mental Health, Rehabilitation & Recovery, another endowed position. As Chair, Forchuk provided scientific and administrative leadership to a large group of researchers based at St. Joseph's Parkwood Institute focused on mental health, activity and mobility, and cognitive vitality and brain health.

Many research leaders can only afford to spend two days a week on their own research projects, she explains. Endowed chair positions change that.

"Imagine travelling across the country to create a national study focused on homelessness, two days a week at a time," she suggests candidly. "You couldn't."

Forchuk is referring to her landmark project to better understand how many people in Canada are experiencing homelessness and who they are. The goal was to develop more accurate sources of data and recommend appropriate support and services. Her work is already resulting in important changes.

Today, Forchuk is embarking on another cross-country research project to find solutions related to homelessness for Canadian veterans who are women.

Like Forchuk, Burton's Chair position requires him to provide operational and research leadership, including developing research networks and partnerships nationally and internationally to advance studies that will revolutionize care.

"As the Chair, I think it is important that I have wide-ranging projects that benefit people in our own community and beyond," says Burton, who is optimistic about the outcomes of several of his team's studies.

> When a donor gives to an endowed research chair, they are building capacity in the present day and creating future value and opportunity.
>
> – MICHELLE CAMPBELL, PRESIDENT & CEO, ST. JOSEPH'S HEALTH CARE FOUNDATION

Cheryl Forchuk, PhD, Lawson Research Institute scientist, drives leading-edge national research on homelessness in Canada, reshaping how data is gathered and solutions are developed—thanks to the vital support of endowed research chairs.

He recently partnered with London's First Episode Mood and Anxiety Program to study the impact of fermented foods on the microbiome of young people taking medications for mental health conditions.

One of the side effects of these medications is weight gain, which deters some patients from taking it. By providing patients with slow-release apple cider capsules, which have similar properties to fermented foods and positively affect the microbiome, they have seen an overall improvement in participants' mental health and cholesterol after just a few months.

Reflecting on his team's research achievements to date and the potential of what's to come, Burton emphasizes how vital endowed chairs are to the sustainability of research and the hope to translate newly discovered knowledge into medical practice.

"Research funding from other sources comes and goes," he says, "but endowed chair positions that are focused on improving human health provide continuity, build research and create change benefiting all of us."

STANDING UP TO FALLS

By merging world class care with research and artificial intelligence, St. Joseph's Health Care London is catching falls before they happen.

They wreak havoc on independence and well-being, making them one Canada's most pressing health challenges: falls.

A leading cause of injury-related hospitalizations, even death, among older adults, a fall can happen anytime, anywhere – with 50 per cent occurring at home. But what if we could predict and prevent falls before they happen?

A pioneering initiative at St. Joseph's Health Care London (St. Joseph's) is doing just that. The 3FM Clinic, short for Falls, Fractures, Frailty and Mobility, at St. Joseph's Parkwood Institute is at the leading edge of falls prevention in Canada, integrating research with clinical practice to offer hope and practical solutions to older adults.

Led by St. Joseph's geriatrician Dr. Jaspreet Bhangu and Western University rehabilitation scientist and physiotherapist Janelle Unger, PhD, the visionary 3FM Clinic is working to prevent falls before they happen.

"We know there are a number of factors that can cause an older adult to fall such as illness, medication side effects, balance and gait issues, cognitive impairment, visual changes and environmental hazards," says Bhangu. "What we're working to understand is how those factors together impact individual patients and their risk of falling."

To do so, the 3FM Clinic team – one of the largest, most diverse teams of its kind in the country – completes a multi-step evaluation of patients:

- Nurses gather their medical history, current medications, functional abilities and personal goals.
- Physiotherapists measure the patient's gait (how they walk) and balance to understand their physical capabilities.
- Occupational therapists test their vision and cognitive function and identify issues that might hinder the individual's ability to perform routine tasks safely.
- A geriatrician focuses on medical risk factors such as bone health, medications and cardiovascular health to help manage risks associated with aging.

The team then creates a customized care plan that incorporates exercises, therapeutic interventions and educational strategies.

> "Traditional fall prediction models often rely on limited data and lack of real-world input from clinicians and patients.
>
> – JANELLE UNGER, PhD

Janelle Unger, PhD, uses her unique training and experience as a physiotherapist to further the field of discovery in predicting and preventing falls.

On the research side, Unger and her team in the RED Neuro Lab at St. Joseph's Gray Centre for Mobility and Activity are leveraging artificial intelligence (AI) to predict falls more accurately.

"Traditional fall prediction models often rely on limited data and lack real-world input from clinicians and patients," explains Unger. "By partnering with Dr. Bhangu and the clinical team, as well as the patients in the 3FM Clinic, we're able to integrate clinical information with biomechanical data collected from wearable sensors known as inertial measurement units (IMUs)."

An IMU is a device that tracks and measures a person's movement and orientation and provides valuable data on how that person moves and stays stable.

"We plan to use AI to analyze the data collected through the IMUs and are working to create accurate fall prediction models," says Unger. "This research, funded by Western's Bone and Joint Institute, has the potential to improve care decisions, enhance preventive strategies and ultimately reduce the incidence of fall-related injuries and hospitalizations for our patients and people across the globe."

By embracing innovative research and compassionate care, the 3FM Clinic is a model for future efforts in fall prevention and geriatric care, offering a safer, more independent future for older adults.

Dr. Jaspreet Bhangu, world-renowned geriatrician and researcher at St. Joseph's Health Care London, is determining the multiple factors that cause falls in older adults.

You can prevent falls too

Home improvements

Improved lighting, clear walkways and assistive bathroom fixtures.

Exercise

Participate in strength and balance exercises to enhance physical fitness.

Medication reviews

Regularly have your medications reviewed to identify if you are at risk of falling.

Use assistive devices

Properly fitted walkers or canes provide essential support and stability.

Fitted footwear

Shoes (not slippers or flip-flops) with appropriate tread and low heels help prevent slips and falls. They should also fit your feet.

my ST. JOSEPH'S

St. Joseph's Health Care London provides care through a unique mix of clinical settings – making us one of the most complex health care organizations in Ontario. In a continual effort to bring the best care possible to those we serve, we constantly engage patients and their families, physicians, researchers, staff, volunteers, donors and many partners to ensure St. Joseph's takes innovative steps in addressing the health care needs of our community, now and in the future.

MY ST. JOSEPH'S IS

St. Joseph's Hospital	Parkwood Institute
Mount Hope Centre for Long Term Care	Southwest Centre for Forensic Mental Health Care
Lawson Research Institute	Teams, clinics and programs in our community and beyond.

SHARE YOUR FEEDBACK OR STORY WITH US

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