

# ACTION

Innovation & Research



GRAND RIVER HOSPITAL  
ISSUE 7 - 2022



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The Office of Innovation & Research coordinates all research and innovation-related activities at Grand River Hospital, one of the largest and busiest community hospitals in Ontario, with over 600 beds, approximately 4000 staff, and more than 700 physicians, dentists, midwives and nurse practitioners. The Office of Innovation & Research supports and participates in multidisciplinary clinician-based applied research in each of Grand River Hospital's eight Areas of Care. Through partnerships with institutions across the Waterloo-Wellington Region, including the University of Waterloo and McMaster University Michael G. DeGroote School of Medicine Waterloo Regional Campus, the Office of Innovation & Research provides researchers and clinicians the opportunity to work together on groundbreaking studies that helps the Hospital advance exceptional care.

# LETTER *from the* DIRECTOR

02

"Status Quo" is a Latin phrase meaning the existing state of affairs; in health care, we use the phrase 'standard of care' to represent a guideline that specifies the appropriate medical treatment based on scientific evidence and collaboration among professionals in the field.

In this issue of ACTION, we are pleased to highlight a number of research and innovation initiatives aimed at challenging the status quo of health care delivery to ensure our patients receive the utmost excellence in their health care journey at Grand River Hospital.

Whether it is studying the implementation of an innovative intraoperative device, conducting a clinical trial to test the efficacy of a medication for ICU patients, or examining the potential to improve outcomes for patients undergoing dialysis, these are just a few of the initiatives currently being



*Carla Girolametto, Director of Innovation,  
Research and Clinical Trials*

spearheaded by our research teams. All of these projects aim to examine current standards of care and determine whether there is new scientific evidence that supports changing the status quo to implement new standards going forward.

Join me in reading about these new avenues of discovery being explored at Grand River Hospital: **where innovation becomes application.**

# THE EVOLUTION

## Health care is always evolving.



*Dr. Paul Hosek Grand River Hospital Intensivist & REVISE Study Lead*

The theories and practices of yesterday continue to be re-tested and re-examined to ensure improvements in patient-centred outcomes. Believing that there is always more to learn, critical care teams continue to challenge the norms to ensure excellence in patient care.

Led by Chief Investigator, Professor Deborah Cook of McMaster University, intensive care units (ICUs) across the globe are participating in the REVISE Trial as a part of their work to re-evaluate the care process for treating patients for gastrointestinal bleeding. Grand River Hospital is one of 20 sites in Ontario participating in the trial, with a study team being led by intensivist Dr. Paul Hosek. The trial is also being conducted across five Canadian provinces and at sites in the United States, United Kingdom, Australia, and Saudi Arabia.

Patients who are critically ill and being cared for in the ICU can develop ulcers in their esophagus, stomach or duodenum, especially those who require a ventilator (breathing machine). Many of these patients are given proton pump inhibitors, a class of drugs that suppress acid secretion in the stomach, to prevent the development of stress-related ulcers and decrease the risk of bleeding. This preventative treatment has been adopted into clinical practice, incorporated into clinical practice guidelines, and is now a widespread practice in ICUs.

# OF ICU CARE

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However, patients in the ICU seem to rarely develop bleeding from stress ulcers compared to decades ago, which can likely be attributed to modern medicine, better critical care resuscitation and earlier feeding. In addition, recent research suggests that proton pump inhibitors may increase a patient's risk of more serious lung infections (pneumonia) and bowel infections (*Clostridium difficile*) and possibly contribute to acute kidney injury. The quality of published research in this area is modest, and it is difficult to tell to what degree patients are benefiting from or potentially being harmed by the use of proton pump inhibitors in these scenarios.

The purpose of the REVISE Trial is to determine if pantoprazole, a specific proton pump inhibitor, is effective at preventing bleeding from stomach ulcers in patients receiving mechanical ventilation in the ICU and whether it causes any of the aforementioned adverse effects.

Patients enrolled in this trial will be followed by the research team while in the ICU. They will be given either pantoprazole or a placebo, with an equal chance of receiving one versus the other. This large international study will provide important results that will inform the future standards of care for patients on ventilators in the ICU.

**"It is important for community hospitals to participate in clinical research"**

said Dr. Hosek. "Broad patient representation from a range of hospitals in the province and country accelerates the pace of knowledge acquisition. As a community hospital, we need to continue to build the infrastructure for research so that the population of patients we serve in our community are represented in research findings."

"Relatively few Canadian hospitals participate in clinical research," explained Dr. Cook. "When centres such as Grand River account for over two-thirds of Canadian hospital beds, it is important that studies such as this are conducted in community hospitals. This helps to create more generalizable knowledge for all of our communities."

## WHAT ARE STRESS ULCERS?

Stress ulcers are defects that develop in the mucosal lining of the stomach. They occur primarily in patients who are critically ill.

Stress ulcers are most likely to develop in approximately 1-3% of patients who are on the breathing machine during their stay in the ICU.

# INVESTING IN INNOVATION

When the Ministry of Health announced that they would be investing \$1 million in a study at Grand River Hospital to evaluate the use of an intraoperative technology that could improve outcomes for patients who require hip replacement surgery, it was a giant leap forward for the adoption of innovative technology in Ontario.

This provincial investment is the first of its kind and aims to create opportunities to support the adoption of and explore funding for new and innovative technologies in health care.

For this study, Grand River Hospital will be utilizing Intellijoint HIP®, a surgeon-controlled navigation tool for total hip replacement, or total hip arthroplasty. The tool provides measurements in real time during surgery for alignment of the hip implants without the patient having to spend any additional time in surgery. Intra-operative navigation tools are innovative technologies intended to increase the accuracy of hip implants, which could lead to faster healing times for patients and decrease the likelihood of hip dislocations post-surgery.

In addition to its potential to improve patient outcomes, the Ontario Ministry of Health also noted that the study "will inform the development of a new pathway to improve the

adoption of new medical innovations that will innovate patient care in hospitals across the province."<sup>1</sup> Its goal is to help us both understand the benefit of this new technology for patients and identify any economic efficiencies that can be realized across the provincial health system as a result of its use.


"Grand River is excited to lead a comprehensive research study that will assess the clinical and economic merits of this technology," said Sven Byl, Vice President Digital, Insights, Improvement & Innovation at Grand River Hospital. "This research will enable us to make recommendations to the Ministry regarding funding models that support the use of new and innovative tools and technology to improve the quality of care for patients and provide economic benefits across the health system. We are also pleased to work with McMaster University who will be supporting us in the data analysis and dissemination of study results."

<sup>1</sup> <https://news.ontario.ca/en/release/1002079/ontario-building-a-stronger-more-resilient-health-care->



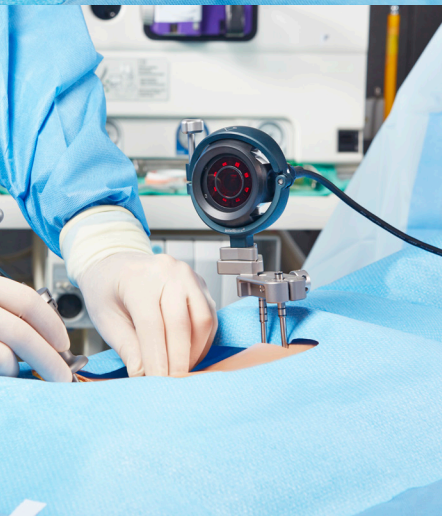


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Grand River Hospital performs over 400 total hip arthroplasties each year and will start this study in the summer of 2022.

"This investment from the Ministry of Health is great news," said Dr. Matthew Snider, orthopedic surgeon at Grand River Hospital. "These funds will support our department to rigorously test this solution with the hope that we can continue to improve our ability to provide world class care for our patients. The focus on leveraging innovation to provide the best patient experience is something that we truly value."



Intellijoint HIP® has been licensed by Health Canada since 2015 and has been used in over 30,000 procedures around the globe. With this investment from the Ministry of Health, Grand River Hospital will become the first Canadian hospital to utilize Intellijoint HIP® to perform a comprehensive study looking at health system benefits in addition to improvements in clinical outcomes.



"Our team couldn't be more excited with this investment by the province in Grand River Hospital for the conduct of this study, which could lead to broader adoption across the province," stated Armen Bakirtzian, co-founder and CEO of Intellijoint Surgical. "Surgeons in our region will have the opportunity to test a novel surgical technology that was invented, designed and developed right here in Kitchener-Waterloo."

**G**rand River Hospital has recently launched a **surgical remote monitoring platform** to support patients that are having hip or knee replacements: SeamlessMD.

"SeamlessMD is a very user-friendly platform that helps to enhance communication between our patients and care team," explains Dr. Matthew Snider, an orthopedic surgeon at Grand River Hospital. "In the data available to us through the dashboards, we can efficiently track patient recovery at home and address any post-surgical complications."



Grand River Hospital is the first hospital in Southeastern Ontario to implement SeamlessMD as part of Ontario Health's recent remote patient monitoring initiative, which will expand access to care from home and minimize in-person surgery visits in response to the pandemic.

With SeamlessMD, patients undergoing hip or knee surgery at Grand River Hospital use their own devices (e.g. smartphone, tablet and/or computer) to receive support before their procedure and throughout their recovery in the form of personalized education, progress-tracking, and post-op symptom monitoring. After being discharged from the hospital, patients can remotely connect with their care team through the SeamlessMD platform to share photos of their wounds and self-report their progress by entering data such as pain scores, symptoms and updates on their range of motion. This allows their team to make personalized care recommendations and enables faster intervention from the surgical care team if necessary.

# MAKING SEAM

The Hospital has been using SeamlessMD to help reduce visits to the emergency department, readmissions and the length of patients' hospital stays, especially during the pandemic. To date, more than 600 patients have enrolled in the program, and it has helped prevent two infections from becoming serious complications during the post-op period. Additionally, 89% of patients at Grand River Hospital that have used SeamlessMD reported that the platform made them feel more

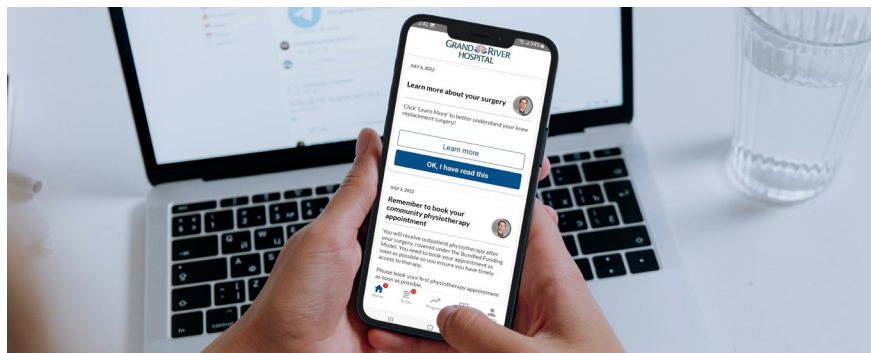
confident during recovery, with one patient sharing, "I [find] it comforting to know that there is a caring team out there that is following our recovery progress. I'm sure it has saved on many calls to a doctor's office or trips to the emergency department."

"In light of the COVID-19 pandemic, SeamlessMD provides an effective alternative to in-person care that helps us protect employee health and patient safety," says Lisa Buttazoni, Program Director of Critical Care and Surgical Services at Grand River Hospital. "The implementation of this technology supports our mission to continuously deliver innovative care by helping us stay connected with our patients, regardless of where they live."

# G CARE LESS

**"SeamlessMD is honoured to support Grand River Hospital as part of Ontario Health's initiative to expand remote monitoring efforts across Ontario"**

shares Dr. Joshua Liu, CEO at SeamlessMD. "We are dedicated to the delivery of safe and effective virtual care to protect the health and well-being of our communities and are grateful for the ongoing support provided by Ontario Health."



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In partnership with the University of Waterloo's NSERC Collaborative Research and Training Experience (CREATE) program, student investigator and PhD candidate Cristina Herrera will be the first trainee to conduct research at Grand River Hospital. CREATE Training in Global Biomedical Technology Research and Innovation is a graduate program offering training in areas such as professional skills, communication and collaboration in the patient, medical and biotechnology industries, providing trainees with opportunities to work collaboratively in their field to co-discover problems and solutions through research and innovation. Delivered by the university's Centre for Bioengineering and Biotechnology (CBB), its long-term objective is to produce high-quality personnel capable of thriving in a biomedical technology career.



# CREATE-ING OPPORTUNITIES TO LEARN

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The CREATE research project managed by Herrera is focused on quantifying the changes in shoulder health indicators in breast cancer patients throughout their radiation therapy journey. Breast cancer is the most common cancer in the western world, with the number of new cases increasing every year. Radiation therapy has proven to be an accurate strategy to treat breast

cancer, reducing not only cancer mortality but also the risk of breast cancer recurrence by 70%. However, cancer treatments, including radiation therapy, are also linked to several complications such as imbalances in shoulder muscle strength and activation, reduced complex range of motion in the shoulders, and arm lymphedema. The role radiation therapy plays in causing these





"The importance of this research lies in its novelty and relevance for the health community. The project was built upon needs arising from the health system, and I hope its outcome will help clinicians to develop targeted rehabilitation protocols aimed at overcoming changes in shoulder functionality following radiation treatment," said Herrera.

A total of 50 breast cancer patients will be recruited to participate in the study. Eligible participants will be identified by the local onsite investigator, Hannah Stracey, Oncology Nurse Practitioner at Grand River Regional Cancer Center. The research will be led by Principal Investigator, Professor Clark Dickerson, PhD, and managed by student investigator Cristina Herrera, PhD candidate from the Department of Kinesiology & Health Sciences, University of Waterloo.

complications and the extent of its influence on shoulder physical capabilities and dysfunction remain unclear. To date, the effect of an intervention program focused on shoulder strength alongside shoulder functional indicator assessments before, during, and after radiation therapy in breast cancer patients has yet to be investigated.

To gain a thoughtful understanding of the implications of treating breast cancer with radiation therapy and to create a bridge between research and the health community, the student investigator gathered information from several health care professionals who practice at Grand River Hospital. These health experts agreed that there was a need to study the relationship between shoulder health indicators exclusively within the radiation therapy window (the range of concentrations of radiation therapy that can be administered to provide a therapeutic response without causing significant adverse effects).



*Student Investigator,  
Cristina Herrera*

For patients participating in the research, their shoulder health assessment will be conducted at three intervals. This will be done with the use of wearable surface electromyography (sEMG) and inertial measurement units (IMUs) to track their shoulder muscle activation and shoulder complex range of motion and the use of a hand-held dynamometer to measure their shoulder muscle strength.

The student investigator's background is in physiotherapy, and her PhD studies in Kinesiology are focused on clinical biomechanics. This project at Grand River Hospital is extremely relevant to accomplishing her career goals and learning objectives as it combines both assessment techniques to evaluate biomechanical and functional indicators and the prescription of rehabilitation exercises.

"When I became a physiotherapist, I had the opportunity to work with several clinical populations. I realized how helpful rehabilitation was for those individuals. However, I also noticed that there was still much to be done in order to reach my patients' objectives," Herrera explained. "Biomechanical assessment such as strength, activation, and joint range of motion helps to build more accurate rehabilitation strategies, leading to more efficient programs and faster recovery. A combination of both physiotherapy and biomechanics is the key to upgrading rehabilitation to higher levels."

Grand River Hospital has set a strategic objective to be a preferred destination for learners and is pleased to partner with the University of Waterloo's NSERC CREATE Training in Global Biomedical Technology Research and Innovation program to achieve that goal.



"The opportunity for our hospital to leverage the expertise of an educational institution like the University of Waterloo will lead to groundbreaking advancements for care," said Carla Girolametto, Director of Innovation & Research at Grand River Hospital. "This will be the first of many students we will see leading excellent research that will be of benefit to current and future patients."

"CBB is grateful to have such an enthusiastic and like-minded partner in Grand River Hospital. The Innovation team at Grand River Hospital believes in the 'needs-first approach', which is the cornerstone of our NSERC CREATE Training Program in Global Biomedical Technology Research and Innovation. Grand River Hospital has dedicated significant resources to our CREATE trainees, which has facilitated valuable research and training opportunities. We look forward to continued collaboration that will ultimately improve health outcomes and position University of Waterloo graduates as leaders at the interface of health and engineering," said Kenrick Vassall, Program Coordinator at CBB.

"Since the start of this project in 2019, health professionals from the Cancer Centre have played an integral role by collaborating in the creation of the research question, providing ideas for study design, and suggesting approaches to facilitate this study with breast cancer patients," said Herrera. "This extraordinary and often rare interdisciplinary work built a community project that is expected to help both clinicians and oncology patients. I am very grateful to have the opportunity to partner with Grand River Hospital during my educational journey."





# BETTER OUTCOMES FOR PATIENTS RECEIVING

People with failed kidneys need an artificial kidney machine, called a dialysis machine, to remove toxins and extra fluid from their blood through a process called dialysis. Grand River Hospital's renal program is the regional provider for chronic kidney disease services, including dialysis, for those living in Waterloo Region and Wellington County. Most patients receive dialysis treatments three times a week, and each treatment is about four hours long.

In order to ensure the best outcomes for dialysis patients, Grand River Hospital is participating in a new clinical trial called Dial-Mag, which aims to determine if changing the concentration of magnesium used in the dialysis process improves patient outcomes. This four-province study of over 130 hemodialysis units is led nationally by Dr. Amit Garg of Western University and at Grand River Hospital by nephrologist Dr. Laura Gregor.

In Canada, dialysis solution, known as dialysate, contains magnesium in concentrations of 0.38, 0.5, or 0.75 mmol/L. Currently, there is no



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consensus on what magnesium concentration is best, and all three concentrations are used today as the standard of care in Canadian dialysis units. There is some evidence to suggest that a low concentration of magnesium in a patient's blood (serum) correlates with poor outcomes for those receiving hemodialysis, including cardiovascular-related hospitalization and an increase in muscle cramps. In an effort to determine the best course of treatment for patients receiving dialysis, this two-arm, cluster-randomized, multicentre trial will compare outcomes in centres that use a 0.75 mmol/L concentration of magnesium in the dialysis process versus concentrations less than or equal to 0.5 mmol/L.



# OR G DIALYSIS

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"As a nephrologist I have provided care to patients receiving hemodialysis over the last two decades," said Dr. Garg. "I see first hand how difficult kidney disease and dialysis can be. We are conducting this collaborative research so that we can better understand what treatments help patients live longer and healthier [and ensure that] the most effective treatments are used broadly in the health care system."

Patients at Grand River Hospital who receive regular hemodialysis to treat chronic kidney failure, known as maintenance hemodialysis, will be followed for study outcomes during the trial period. Anonymous information on patient characteristics and outcomes will be obtained from the large health care databases of Ontario, and patients will provide anonymous information twice a year on how often they experience muscle cramps. Muscle cramps negatively impact the experience of many patients receiving hemodialysis, and this study will help to determine what concentration of dialysis magnesium reduces them.

"Here in the Waterloo Region, we have a large dialysis program. It is very exciting and important for community programs such as ours to be able to participate in a clinical trial of this magnitude. The research being led by Dr. Garg will enhance patient care across the country," explained Dr. Gregor. "I hear frequently about symptoms and side effects patients experience while on dialysis. Trials such as this provide vital information that will hopefully lead to improved outcomes and quality of life for our patients."

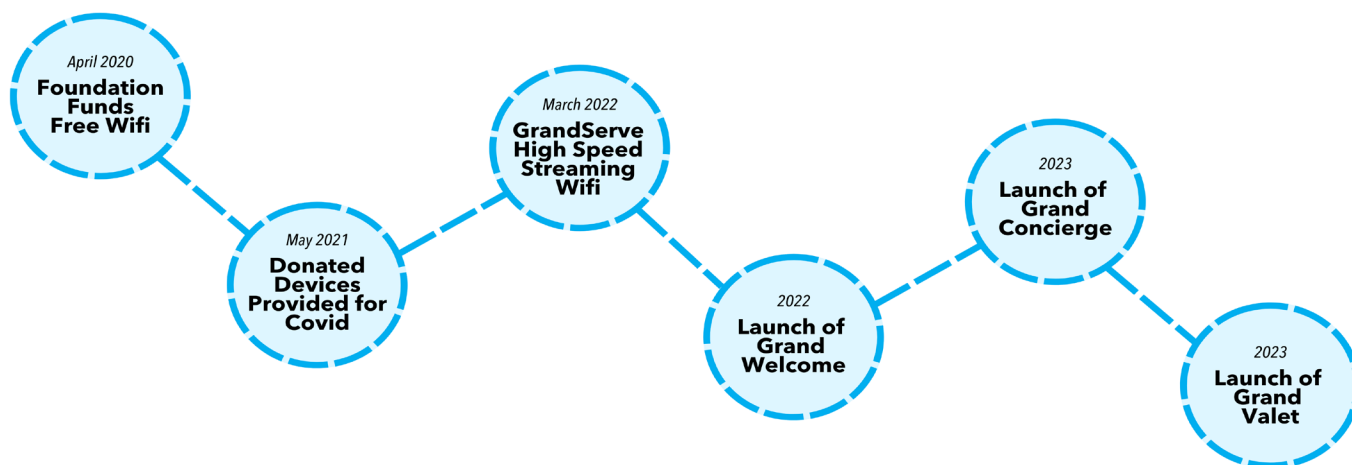
Grand River Hospital also participated in a similar trial from 2017-2021 called MyTEMP that examined the impact of the temperature of dialysis solution on the outcomes of dialysis patients. The study compared patient outcomes of those who received dialysate at body temperature (which was considered the standard of care at the time) versus those who received dialysate at a personalized temperature (0.5 °C below body temperature). The MyTEMP results are currently being analyzed and will be available later this year.



# GrandServe:

# THE FUTURE OF

# PATIENT EXPERIENCE



GrandServe is a new digital experience program that is transforming the hospital experience for patients, families and caregivers alike. Made possible by Grand River Hospital Foundation and support from our incredible community, GrandServe is a part of our vision for a world class health system in Kitchener-Waterloo. We are revolutionizing the experience of spending time at the hospital through a few key components: free high-speed WiFi, a device lending program, and a new, innovative concierge service.



## Free high-speed WiFi for patients, families and caregivers

In March of 2022, Grand River Hospital Foundation launched the first phase of GrandServe: a free high-speed WiFi network exclusively for patients, families, caregivers and visitors at Grand River Hospital. Not only does this new WiFi network have the ability to support a bring-your-own-device program so patients and visitors can stream entertainment and stay connected with loved ones while at the hospital, but it is also the first step in a much larger initiative that will enhance patient experience in new and innovative ways.

## Take Action and Help Us Help Hospital Staff



SCAN ME

Not only will you make a difference for each of the team members at Grand River Hospital, but you will also help us build a stronger health care system for our community when we need it most.

[innovationneverstops.ca](https://www.innovationneverstops.ca)

## First-of-its-kind patient concierge service

Inspired by delivery apps like DoorDash and UberEATS, the GrandServe concierge service will allow patients to place orders for delivery that are brought right to their hospital room or waiting area! Starting with options that are available within the hospital, like coffee or tea from Tim Hortons, this service will eventually expand to offer anything we can provide with the support of local partners. All of this will be made possible by Grand River Hospital's volunteer team who will make these deliveries to ensure our patients and caregivers have everything they need.

Unprecedented initiatives like GrandServe are key to the future of local health care. Innovation allows us to create a future that embraces new ideas and new ways of doing things, reflects the ever-changing needs of patients and caregivers in the programs and services we develop, and builds upon the greatness that already exists within our health system to elevate care and the overall health experience — it is our key to a world class health system right here in Waterloo Region.

# Show What You Can Give To Make An Impact

Read more about GrandServe and Donate to Support Patient Experience at [www.grandservice.ca](https://www.grandservice.ca)

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# INNOVATION & RESEARCH ACTION

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Designed by Maida Majeed



Office Of Innovation  
& Research

Grand River Hospital

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