ACTION AT GRH

BRINGING TOGETHER INNOVATION AND EXCEPTIONAL CARE

Office of Research and Innovation
Grand River Hospital

Spotlight on cancer research

Highlighting over 15 years of innovation as Waterloo Region's leader in cancer care

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Spring/Summer 2019

Office of Research and Innovation
Grand River Hospital

The Office of Research and Innovation (ORI) at Grand River Hospital brings clinicians and research and industry partners together to explore new ways of improving patient care.

We coordinate all research and innovation activities at Grand River Hospital, one of the largest and busiest community hospitals in Ontario, with nearly 600 beds, approximately 3500 staff, and 600 physicians, dentists, midwives and nurse practitioners. ORI supports and participates in multidisciplinary clinician-based applied research in each of GRH's 15 clinical program and service areas. Through partnerships with institutions across the Waterloo-Wellington region, such as the University of Waterloo, ORI provides researchers and clinicians the opportunity to work together on groundbreaking studies that advance exceptional care at GRH.

Our history

2003 — GRH Regional Cancer Centre opens
GRH's cancer centre is opened and GRH begins participating in clinical trials for cancer patients

2005 — First GRH led clinical trial
GRH leads our first major clinical trial initiated by a local physician and enrolls over 200 patients for the study. One of our largest studies to date

2008 — GRH Research Committee is formed
GRH's Research Committee is formed alongside the Cancer program's Scientific Review Committee

2011 — VP of Research appointed
GRH's first vice president of research, Dr. Tina Mah, is appointed.

2015 — A formal partnership with UW
GRH signs a Memorandum of Understanding with the University of Waterloo, launching a formal research partnership between GRH & UW

2017 — "Innovation" as a strategic objective
GRH's Board of Directors identifies "innovation" as a strategic objective and one of GRH's core values.

2018 — The Office of Research and Innovation
The department of research becomes the "Office of Research and Innovation at Grand River Hospital" to reflect the hospital's diverse activities and partnerships

grhosp.on.ca/research

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Piloting a new way to detect lung cancer faster

Grand River Hospital (GRH) has partnered with KA Imaging to conduct a pilot study on the use of a high-resolution multi-energy digital x-ray imager for patients with lung nodules. This innovative technology is faster and less expensive, with the potential to detect lung cancer earlier with better image quality and lower levels of radiation than a traditional CT scan.

A startup out of the University of Waterloo, KA Imaging specializes in the development of low-cost portable multi-energy x-ray detectors like the one being piloted at GRH. KA's multi-energy detector is similar to previous dual energy detectors traditionally used to detect bone density but is unique because it requires only one exposure, captures multiple energies enabling soft tissue and bone separation, and is portable.

The study is comparing the quality of images between a standard CT scan and the KA Imaging developed multi-energy digital x-ray imager. Up to 30 patients with existing lung nodules who are already undergoing CT scans are being recruited to the study. Patients who enroll will receive an x-ray on a KA Imaging prototype panel the same day as their scheduled CT scan. The prototype panels, which send images to nearby computers, are installed on one of GRH's existing x-ray machines, making their potential adoption easy and inexpensive. To date, 21 patients have joined the study.

"We are excited to partner with KA Imaging to trial this innovative technology at Grand River Hospital," said Dr. Tina Mah, vice president of research and innovation at GRH. "Our mandate is to advance exceptional care and we continue to be leaders in our community by trialing new technologies, like this multi-energy x-ray, in partnership with our patients."

KA Imaging founder Dr. Karim S. Karim, an electrical and computer engineering professor at University of Waterloo, said that capability could pave the way for widespread screening programs to help save lives as this technology may be used in the future to detect lung cancer earlier.

"If a cancer lesion is located in the apex of a lung and bone obscures it, it can't hide anymore," said Professor Karim. "If an abnormality is hiding behind the heart, we can now see it nice and clearly."

Unlike CT scans, which are typically used only for high-risk patients because of radiation concerns, low radiation levels mean retrofitted x-ray machines could be used providing superior image quality at a lower dose of radiation. The additional value-add is this is acheived at a fraction of the cost of CT scan. Karim says nothing like this exists now.

Medical imaging team lead, Lisa Routhier (left), stands with patient John in front of the KA Imaging developed scanner and explains how the technology works.

To date, 21 patients have enrolled in this clinical trial study.

Dr. Vikram Venkatesh is a radiologist at GRH and is leading the study at the hospital. He is excited to see the study progress and the potential impact an x-ray like this could have on improving patient care.

"The human side of this work is so important," said Dr. Venkatesh. "We cannot make advancements in patient care without first working with them to trial new technologies."

The initial prototype developed by KA Imaging was made possible through funding from Grand Challenges Canada (GCC), FACIT, and the Ontario Centres of Excellence (OCE). KA Imaging recently received Health Canada approval to extend the trial to include patients suspected of having lung cancer in addition to patients with existing cancer. Following study completion and review of the information collected during the study, KA Imaging plans to launch the commercial version of the technology.

"Partnering with Grand River Hospital is a tremendous opportunity to trial this innovation at home in the Waterloo Region," said Amol Karnick, president and chief executive officer of KA Imaging. "We look forward to continuing our partnership with GRH, working together to improve patient care in our region."

To learn more about this study visit http://www.grhosp.on.ca/research

A digital revolution for faster and smarter diagnoses

GRH and the University of Waterloo partner with Waterloo Region's Huron Digital Pathology to create a medical search engine for pathology results

Waiting for the results of a biopsy can often take time, not just for patients, but for doctors as well. In a cancer diagnosis, for example, assessing a tumour can be complicated and time consuming for every new patient. Being able to retrieve and use images of similar cases from past patients when examining the images of a new patient can help physicians to streamline the diagnostic process.

A research group at the University of Waterloo (UW), in partnership with Huron Digital Pathology and GRH's Laboratory Medicine program, is hoping to improve the pathological assessment of cancer by creating a medical image search engine.

"Millions of medical images are stored in the archives of hospitals and clinics, and generally include detailed patient-specific information such as biopsy findings, treatment plans, and follow-up reports," says Dr. Hamid Tizhoosh, Director of KIMIA Lab at UW and principal investigator of the study. "The ability to correlate new patient images with past diagnosed cases can assist experts to avoid missing malignancies."

In this innovative project, the role of partner hospitals is crucial. Dr. Adrian Batten, Joint Chief of Laboratory Medicine of GRH and SMGH, is a co-investigator in this study and is leading the project work within the hospital laboratory. Following ethics approval, the research team has access to hundreds of medical images which will help build the pathology search engine. Hospital pathologists will validate the results of the search engine performance to determine if the results are correct, meaningful, and useful.

"Digital pathology is on the threshold of contributing to more complete and standardized assessment of aspects of tumour biology," says Dr. Batten. "We are quite excited about this project that will give us the opportunity to be directly involved in the evolving field of digital pathology. This work will develop sophisticated

"This work will develop sophisticated computer methods for digital image search and identification and introduce this technology to pathology residents; shaping care for the next generation of physicians."

Dr. Adrian Batten
Joint Chief of Laboratory Medicine
Grand River Hospital and St. Mary's General Hospital

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The project was awarded $3.1m by the Ontario Research Fund – Research Excellence program (ORF-RE) to conduct this work by St. Jacob's based Huron Digital Pathology – the only Canadian manufacturer of full-slide digital scanners for pathology – partnered together with KIMIA Lab.

Dr. Adrian Batten

"The adoption of digital workflows in pathology has the potential to significantly benefit the quality of patient care in the Waterloo Region and around the world," says Patrick Myles, CEO of Huron Digital Pathology. "Huron's partnership with Dr. Hamid Tizhoosh at UW and Dr. Adrian Batten at Grand River Hospital represents an important milestone in validating this revolutionary medical image search technology."

"Grand River Hospital prides itself on being a community hospital with a mandate for innovative health care. We aim to contribute to the broader health care sector with knowledge gained through participation in research," says Dr. Tina Mah, vice president of research and innovation at GRH. "GRH believes this to be a historic opportunity to embark upon the "digital revolution" of pathology through our participation in this project."

To learn more about this study visit http://www.grhosp.on.ca/research

Spotlight on cancer res

Since 2003, Grand River Hospital has provided premier care to can and care are made possible through clinical research work led and s

Clinical trials are an integral part of the treatment options for cancer patients, not just at Grand River Hospital, but around the world. Since 2003, our medical and radiation oncologists have actively participated in clinical trials to drive cancer treatment forward. We work in partnership with academic institutions, as well as government and private agencies, to conduct clinical trials that contribute to this work. Within the cancer program, we also promote other types of research projects such as prevention, diagnostic, screening and quality of life studies.

Here is a quick look at cancer clinical trial work we conduct at GRH.

Cancer clinical trials at GRH

20+
studies currently recruiting patients for studies in

- Breast cancer
- Colorectal cancer
- Skin cancer
- Prostate cancer

"I cannot imagine a clinical practice without clinical trials, especially in cancer care. We all need to engage in the work. At GRH we have a drive to meet that need. By participating in trials locally, we can offer our patients new therapies closer to home. This opens doors to the examination and introduction of new treatments long before these therapies become widely adopted."

Dr. Nadia Califaretti
Medical Oncologist

100%
of oncologists at Grand River Hospital's cancer centre are involved in clinical trial work

Multi-method trials

Chemotherapy | Radiation | Exercise | Endocrine therapy | Trial registries | Patient experience

100+ patients chose to participate in a clinical trial at GRH in 2018
500+ patients have participated in cancer clinical trials at GRH since 2003

esearch and innovation

ancer patients in Waterloo Region. Our industry leading treatments
d supported by our physicians, clinicians, and staff

Leading the way

GRH initiated research studies moving cancer care forward

Can we use quantum physics to treat cancer?

Dr. Ernest Osei (right), Director of the Medical Physics department has started a research initiative in collaboration with Dr. Raymond LaFlamme (left), the Mike and Ophelia Lazaridis "John von Neumann" Chair in Quantum Information and Director of the Canadian Institute for Advanced Research (CIFAR) Quantum Information Processing program at University of Waterloo.

The team has begun reviewing current literature about quantum applications in cancer treatment and diagnosis. The future plan is to look at the feasibility of applying quantum physics to the treatment planning phase of radiation treatment where a team of radiation oncologists, therapists, and medical physicists plan the most appropriate radiation treatment technique.

Drs. Raymond LaFlamme and Ernest Osei

Dr. Stacey Hubay

Connecting patients to care from home

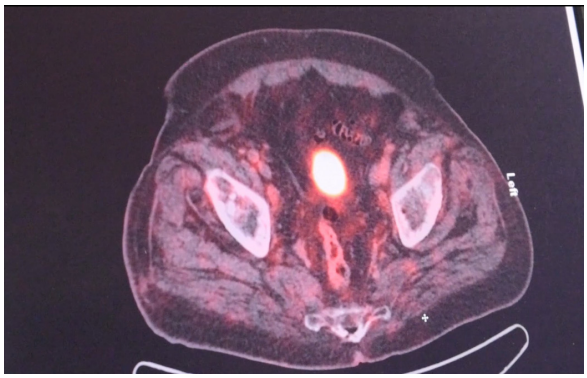
Dr. Stacey Hubay, medical oncologist in Grand River Hospital's Cancer Centre is working with Dr. Tom McFarlane, at the University of Waterloo's School of Pharmacy to lead a team of researchers who have developed a randomized, open label study to evaluate a nurse- and pharmacist-led clinic conducted remotely from the Cancer Centre at Grand River Hospital using OTN teleconferencing as a platform for patients with prostate cancer receiving oral chemotherapy.

To learn more about this study visit http://www.grhosp.on.ca/research

Partnering for prostate cancer research and innovation

Since 2004, Grand River Hospital has partnered with the Grand River chapter of the national charity, Motorcycle Ride for Dad, which raises money to support prostate cancer research. In 15 years, Waterloo Wellington community members have raised close to $1 million to support over 25 projects at GRH that help advance prostate cancer research and, in some cases, give prostate cancer patients in our region access to state-of-the-art treatment options.

Improving treatment through state-of-the-art medical imaging scans

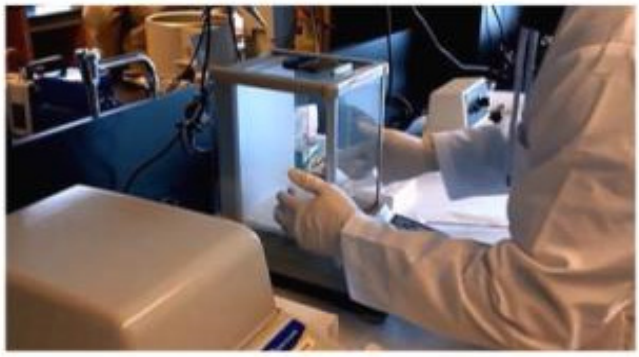


The PEARL study, led at GRH by Dr. Joda Kuk, medical director of radiation oncology, gives prostate cancer patients in our region access to a life-saving state-of-the-art medical imaging scan called a prostate specific membrane antigen (PSMA) positron emission tomography (PET) scan - or PSMA-PET scan.

This scan is better able to detect whether cancer has spread better than many other diagnostic tools including CT and bone scans like x-rays.

With the PEARL study, Dr. Kuk has partnered with Dr. Katherine Zukotynski from the McMaster University Nuclear Medicine Program in Hamilton and St. Joseph's Healthcare Hamilton, which is one of only three hospitals in Canada that houses a PSMA-PET scan machine. Dr. Kuk credits Dr. Zukotynski and her team for making this study possible, granting access to the technology and expertise in the interpretation of results.

To date, the PEARL study has recruited 11 patients.

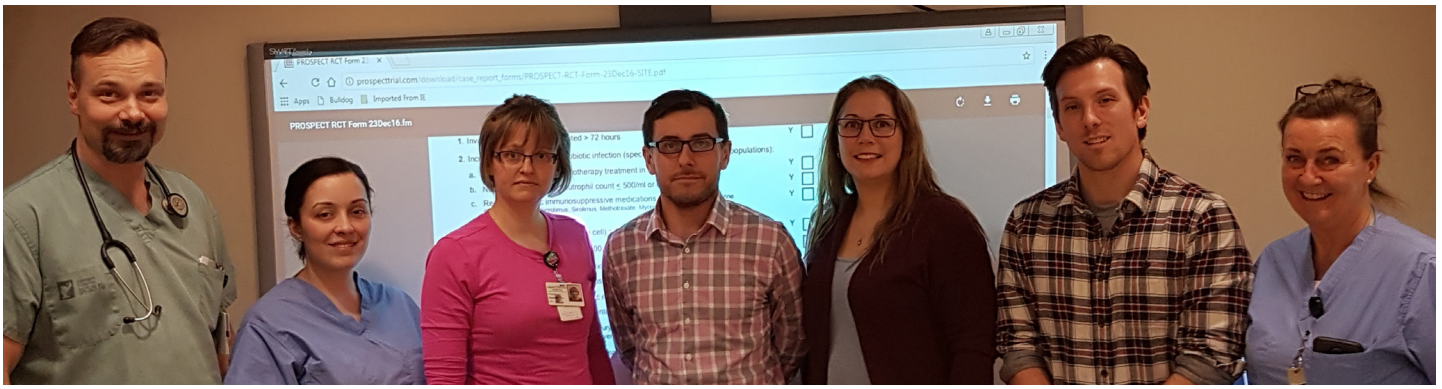


Nanotechnology used to target prostate cancer treatment

Through a partnership between GRH, the University of Waterloo, and the University of Guelph's Ontario Veterinary College, a team of researchers are precision-tuning a treatment using gold nanoparticles to target prostate cancer.

Project leads include Dr. Ernest Osei and Mr. Andre Fleck, both from Grand River Hospital's Medical Physics Department, Dr. Shawn Wettig, UW School of Pharmacy, Dr. Tony Mutsaers, Ontario Veterinary College at the University of Guelph. The team has now received ethics approval to start the research study in dogs with spontaneous occurring prostate cancer. A successful treatment of the canine population will then help translate the model to conducting clinical trials in the human population.

Advancing standards of care through clinical trials



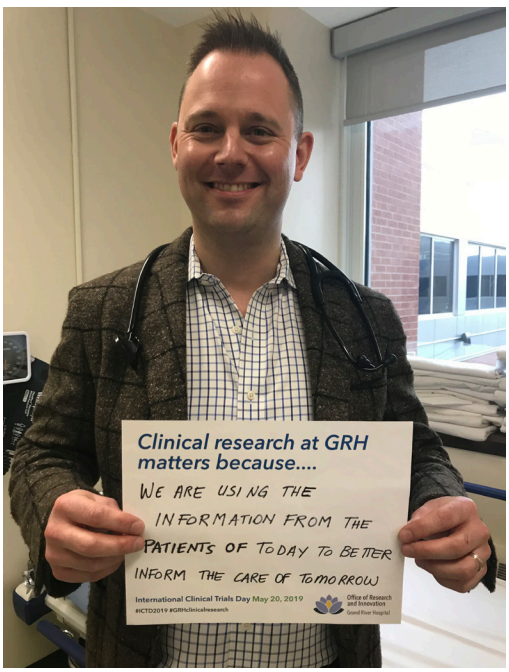
Dr. Paul Hosek (left) with his PROSPECT study team including ICU nurses, McMaster students, and nurse practitioner, Rebecca Jesso (far right)

Exploring the use of probiotics in critically ill patients

Dr. Paul Hosek (pictured above, far left) has led the PROSPECT Study at GRH. This study is sponsored by McMaster University and looks at the use of Probiotics vs Placebo in the prevention of severe pneumonia and endotracheal colonization in mechanically ventilated ICU patients. GRH is one of 11 ICUs in Ontario investigating whether orally ingested L. rhamnosus GG (a common probiotic) prevents ventilator-associated pneumonia and other infections.

The study numbers: 70 patients recruited at GRH.

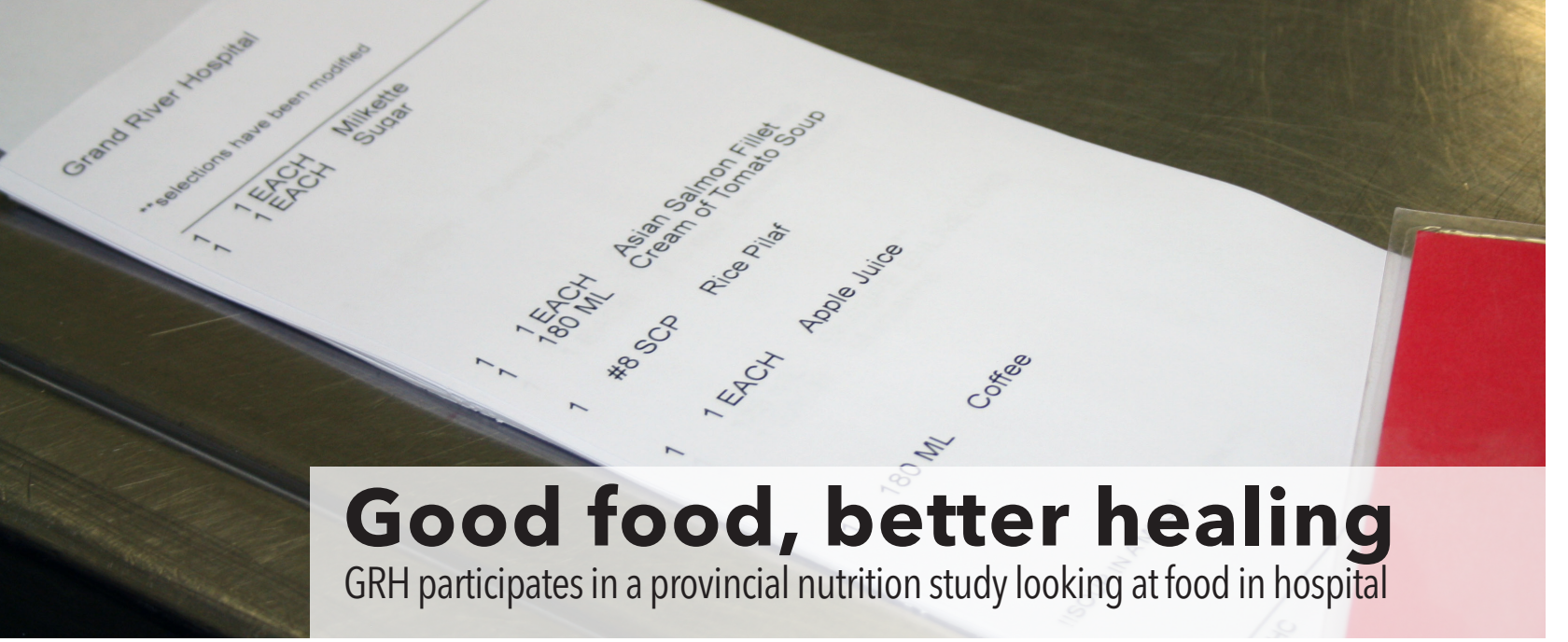
Did you know...
Clinical trials work at GRH is multidiscliplinary? Our studies involve lab, medical imaging, nursing, pharmacy, physicians, and other programs and services.



Does faster surgery lead to faster recovery for hip fracture patients?

Dr. Stephen Giilck (left) has led the HipAttack study at GRH. This study, sponsored by the McMaster University Population Health and Research Institute, is an international randomized controlled trial of patients with a hip fracture that requires a surgical intervention. This trial examines the effect of accelerated medical clearance and accelerated surgery compared to standard care on the 90-day risk of death and major complications from surgery.

The study numbers: 8 patients recruited at GRH; 5 patients were randomized to the fast-track surgery arm.



Good food, better healing

GRH participates in a provincial nutrition study looking at food in hospital

When in hospital, it's natural to crave some of the comforts of home. For some, this may include a favourite item of clothing or a photo, and for many this comfort involves food. At Grand River Hospital (GRH), we understand good food contributes to better healing. Through our Nutrition and Food Services (NFS) program, GRH serves about 1400 meals a day accommodating over 100 different diets for hundreds of patients at both our KW and Freeport Campuses. To better serve our patients' needs, GRH is one of 19 Ontario hospitals participating in a provincial research study aiming to understand what food patients want when they're in hospital and how hospitals can meet those needs.

To determine these preferences, lead investigator, Dr. Lisa Duizer from the University of Guelph and co-investigator, Dr. Heather Keller, Schlegel Research Chair in nutrition and aging and professor at the University of Waterloo, have created an in-depth questionnaire that patients complete after receiving their meal that asks for feedback on different types of food, what food they like, what food they'd like to see on the menu and how much they consumed of their current meal. In addition to the questionnaire, hospitals are performing waste audits of different meals, examining what food comes back most often and if it corresponds to the results of the questionnaire.

Karen Gosine is a dietitian at Grand River Hospital and is overseeing the study at the hospital. She says that food in hospitals is not often studied because it's viewed simply as a service and not a part of patient care and patient healing.

"We currently complete yearly satisfaction surveys with our patients and are constantly monitoring and changing our menus based on patient feedback," says Gosine. "When we asked 100 patients in 2017-18 about their overall meal experience at GRH 79% stated it was good or very good. We are proud of this high satisfaction rate. The results of this research study will validate some of the ideas about food satisfaction or dissatisfaction and compare our results to other hospitals."

"The University of Waterloo's partnership with Grand River Hospital is a natural collaboration," says Keller. "The hospital's expertise and strength of clinical experience goes hand-in-hand with the university's research expertise. We have a powerful and positive relationship."

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Studying vision loss in hospital patients

GRH and the UW School of Optometry and Vision Science study vision loss in patients.

Falls are the most common cause of injury among Canadians over 65 and one of the leading causes of injury-related hospitalizations among seniors. Vision loss is both a known risk factor for falls and very common among the hospital population. Vision is not routinely assessed when patients are admitted to hospital.

Grand River Hospital has partnered with the University of Waterloo School of Optometry and Vision Science (WOVS) to study the vision of patients currently in hospital at our Freeport Campus to better understand current levels of vision loss among the patients. The goal is to create a screening tool to identify patients who have poor vision to inform health care providers of the need for specific falls prevention strategies.

Dr. Abhishek Narayan is the Chief of the Complex Continuing Care and Rehabilitation programs at GRH's Freeport Campus and is leading the study at the hospital.

The UW and GRH vision loss study team with patient, Reginald, centre

"After learning about Dr. Leat's previous research on vision loss in acute hospital patients, I saw an opportunity to expand the study to rehabilitation patients here at Freeport," says Dr. Narayan.

"When a patient is admitted to hospital, we do a good job of taking a patient's history and determining their risk to fall, but the questions we ask don't address vision. If we're able to assess a patient's vision in hospital, not only can we reduce the risk of falls in hospital but we can also help prevent readmission by informing patients' understanding of their vision needs."

The study team from GRH and UW (pictured above) hopes the results of this research can identify whether there is need to consider better access to vision care while in hospital while also allowing patients who don't have adequate eye care gain access to these services.

"I'm hopeful this study will help create a screening tool including questions or tests to assess vision that will be used when patients come in to the hospital and eventually become part of the initial head to toe patient assessment."

Dr. Abhishek Narayan
Chief of Complex Continuing Care and Rehabilitation

To learn more about this study visit http://www.grhosp.on.ca/research

Innovation in progress

Wearables helping assess balance and mobility in frail patients

Collaborators Dr. Bill McIlroy, Kinesiology, and Dr. Don Cowan, Computer Science of the University of Waterloo and Dr. Doug Dittmer, Medical Director Rehabilitation, GRH, are developing a toolkit for assessing human balance and mobility at the Freeport campus outpatient rehabilitation clinic.

Using a tablet and wearable technologies, the toolkit will allow health care professional to capture data from each session with a patient for analysis. The system samples are synchronized from multiple inexpensive wearable devices and generate a patient assessment and possible actions to improve the safety of the patient. The system also produces a large data set of clinical results that can be analyzed for further insights into frailty and other medical conditions related to balance.

The toolkit was one of 31 projects to receive $50k in funding from the Canadian Centre for Aging and Brain Health Innovation, through the Spark program hosted at Baycrest Health Sciences.

Determining risk through algorithms

Since 2015, GRH has been using a quick and easy screening tool known as the assessment urgency algorithm (AUA) which identifies risk in the older adult population. It assists care providers to quickly determine a patient's needs to best support them at home, and get them specialized geriatric services.

The AUA is based on a standardized algorithm that proactively identifies the level of risk experienced by an older adult. It identifies patients who may benefit from community care or specialized geriatric resources.

GRH was one of the first hospitals in Ontario to adopt this tool now used across the province for screening "at risk" seniors.

Karen Simpson, Sarah Sullivan and Jill Schitka in GRH's emergency department.

In the next edition of ACTION at GRH

An interview with Dr. Morteza Ahmadi, Founder of Qidni Labs, who will be collaborating with GRH for his research and innovation endeavours to build an artificial kidney and portable dialysis machine.

"Why work with GRH? One of the key reasons: the people are amazing. There is great expertise in the Renal Program at GRH, which is both one of the largest renal programs in a community hospital in Ontario, as well as the regional centre for patients with chronic kidney disease living in Waterloo Region and Wellington County. I hope we can push things forward together to conduct the research locally and eventually allow the whole community of patients with kidney failure to benefit from this innovation."

Dr. Morteza Ahmadi
Founder of Qidni Labs

Our partners

In 2015, The University of Waterloo and Grand River Hospital launched a partnership to enable academics and clinicians to collaborate on research that will benefit patient care and enrich university research. The two organizations have a shared research agenda that supports patient care while developing new evidence to improve health outcomes.

Since 2010, GRH and UW have collaborated on over 30 research studies and clinical trials.

To learn more about our partnership with the University of Waterloo visit:
https://uwaterloo.ca/research/university-waterloo-grand-river-hospital-research

The Office of Research and Innovation is also proud to partner with the following organizations to advance exceptional research and innovation at Grand River Hospital

Ontario Cancer Research Ethics Board

Tri-Hospital Research Ethics Board (THREB)

Advancing Exceptional Care

Office of Research
and Innovation
Grand River Hospital

grhosp.on.ca/research

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