



Discovery today...  
treatment tomorrow.

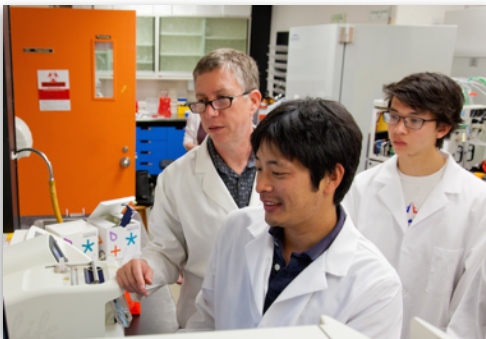




## KGH Research Institute

The KGH Research Institute (KGHRI) was created in September 2010, with a goal to build innovative partnerships and pursue excellence in research through a collaborative approach that leverages our combined strengths to translate knowledge into effective treatments, therapies and best practices.

**Our Mission:** we create and advance knowledge that brings evidence into practice for the benefit and empowerment of our patients, their families and our medical community.



### Our Strategic Priorities:

- Cultivate excellence in focused areas of research and education by increasing the number of outstanding scientists and trainees
- Invest in facilities and infrastructure to enable collaborative and multi-disciplinary research
- Increase external research funding
- Translate research into novel and effective therapies, treatments and best practices
- Increase the dissemination and commercialization of new knowledge
- Champion the creation of a Kingston Health Sciences Research Institute with our partner institutions

### Focus areas of research excellence:

- musculoskeletal
- cardiovascular
- gastrointestinal diseases
- chronic pulmonary disease
- asthma
- urology
- allergy
- maternal and fetal health
- end of life care
- critical care
- emergency medicine

**Read our 2010-14 Report::**

[http://www.kgh.on.ca/en/research/Documents/KGH\\_RI\\_AR2014.pdf](http://www.kgh.on.ca/en/research/Documents/KGH_RI_AR2014.pdf)



## Our Future:

### **The W.J. Henderson Centre for Patient-Oriented Research**

Our new research environment brings scientists, treatment teams, patients and families together to improve health care. We continue to seek the necessary funding to provide a multi-disciplinary hub to attract top scientists whose actively translating their work into new treatments, health policies and improved clinical care.

### **Health Research Kingston**

KGHRI is a major champion and stakeholder in the ongoing development of a virtual Institute to unify the research activities of partner hospitals and Queen's Faculty of Health Sciences. Working together, we can coordinate our activities, enhance our global profile and expand our collaborative reach.



### **Research in Ontario:**

The Council of Academic Hospitals of Ontario (CAHO) is the association of Ontario's 24 academic hospitals and their research institutes. According to CAHO:

- CAHO members conduct 80% of publicly-funded health research in Ontario
- Last year, 19 of the top 40 research hospitals in Canada were CAHO members
- For every \$1 invested in health research in Ontario's 24 research hospitals, \$3 of economic output is generated, and 36,000 jobs are created

Learn more: [www.caho-hospitals.com](http://www.caho-hospitals.com)



## COPD Research at KGHRI

Chronic Obstructive Pulmonary Disease (COPD) is a devastating disease that afflicts approximately 10% of Canadians. In its more advanced stages, COPD can significantly affect quality of life, as many with this disease are housebound and suffer from anxiety due to shortness of breath.

The Respiratory Investigation Unit at KGHRI studies the mechanical, chemical and psychological mechanisms of dyspnea (respiratory discomfort) and activity limitation in patients with a variety of cardiorespiratory diseases.

### Research examples:



**Dr. Alberto Neder** has developed a unique lab to study patients with both heart and lung disease, with the goal of better understanding how the various systems within the body work together under the stress of physical exercise. He is examining how breathing systems and other tools can help patients improve their exercise capacity, and allow them to better tolerate daily physical activities. “Respiration is an intricate dance involving lungs, heart, blood and cells,” he says. We need to better understand how this complex multi-organ system works, and how helping one of the systems can actually make the whole body work better.”

The Laboratory of Clinical Exercise Physiology in Chronic Cardiopulmonary Diseases (LACEP) located at KGHRI studies patients with combined cardio-respiratory and metabolic diseases, with a specific interest in the cardio-circulatory and respiratory interactions that support oxygen transfer from atmospheric air to cell mitochondria. This laboratory is the first in the world to hold the necessary infrastructure to study the entire oxygen pathway during exercise; “from mouth-to-mitochondria”.



## Research examples (continued):

**Dr. Denis O'Donnell**, a Canadian leader in the development of best practices for treating COPD patients, uses a range of breathing tests and brain imaging techniques to better understand the physiological and emotional aspects of breathlessness. “In our studies, we challenge patients with exercise and do detailed physiological testing to try and characterize the disease,” says Dr. O'Donnell. “This allows us to intervene much earlier than we're used to doing.”

**Annetta Black** agreed to participate in Dr. O'Donnell's research projects because she wanted to help others, but found that some of the trial medications have also improved her own quality of life. “Dr. O'Donnell mentioned the studies and I thought taking part in them would be a good thing – if not for me, then for someone else,” she says. “But it's also really helped me.”





## Robotic system gives hospitals new insights into brain injury

A game-changing tool invented at Queen's University and used by scientists worldwide is having an exciting spinoff effect on hospital-based research – with potential benefits for patients around the globe.

The KINARM, the world's first robotic system for precisely measuring how brain injury affects upper limb movement, is now being used in at least 10 patient studies at Kingston General Hospital and its sister institutions, Hotel Dieu Hospital and Providence Care. The system analyses patients' ability to coordinate their arm movements in a complex visual world as they perform a series of standard tasks, such as balancing a virtual marble on a virtual tray, or hitting virtual squash balls being rapidly lobbed towards them. Results are compared with data from healthy individuals, giving clinicians a clear picture of the patient's sensory, motor, and cognitive function.



For clinician scientists at the three hospitals, the KINARM is opening up broad new avenues of investigation into a variety of diseases and conditions, from Parkinson's and Alzheimer's to ALS (Lou Gehrig's Disease), fetal alcohol syndrome, cerebral palsy and even the effects of critical illness, such as stroke and cardiac arrest, on the brain.



Dr. Gordon Boyd, a clinician scientist at the Kingston General Hospital Research Institute and an intensive care specialist in Queen's School of Medicine, is using the KINARM to study why cardiac arrest affects the brain long after the rest of the body has healed. Dr. Boyd is studying how the loss of blood and oxygen delivery to the brain – common effects of critical illness – leads to worse performance while in intensive care, which can affect long-term neurological recovery.



“Parts of the brain that handle sensory, motor and cognitive tasks are more susceptible to low blood pressure and low oxygen,” Dr. Boyd says. I’m using it to identify the degree of dysfunction that these patients have, and correlating it to brain function. The goal is to find ways to treat and prevent neural damage that can affect long-term recovery.”

Invented by Queen’s University neuroscientist Dr. Stephen Scott, the KINARM is used in 51 institutions worldwide, including Keio University in Tokyo, Umea University in Sweden, and the Hotchkiss Brain Institute at the University of Calgary. The technology has been issued six U.S. and four international patents to date.

Today, with KINARMS installed at all three of Kingston’s hospitals, patients have the benefits of a continuum of care not available in any other Canadian city.

**Learn more:**

[bkintechnologies.com](http://bkintechnologies.com)



## Maternal health clinic: improve mom's health, improve family health

An obstetrician at Kingston General Hospital has founded one of the world's first clinics targeting pregnancy and the postpartum period as a window of opportunity for disease prevention in women. Dr. Grame Smith's Maternal Health Clinic screens women for heart disease risk factors and provides resources and tools for maternal and family health.



The clinic was born out of his groundbreaking research showing that women who develop pre-eclampsia are twice as likely to develop heart disease. "Pregnancy is a stress test, in that it can reveal underlying health issues in the mother that may indicate an increased risk of future heart disease," says Dr. Smith. "Approximately 20 percent of expectant mothers exhibit at least one of six indicators during pregnancy."

The Maternal Health Clinic is aimed at women who have had at least one of these pregnancy complications and invites them to be screened six months after their baby is born. The clinic's results and recommendations are forwarded to the woman's family doctor for further follow up and management.

Dr. Smith has also developed a website and smart phone apps that women can use to track pre- and post-pregnancy health indicators such as baby movements and weight gain.

Eighty percent of heart disease is preventable, and pregnancy is a perfect time for health promotion, Dr. Smith says. "Primary prevention is a whole lot better than secondary prevention. The goal of the clinic is not only to identify risk but also to improve long-term health outcomes."

His primary preventive approach is catching on across Canada and in the U.S., with the help of a handbook and related resource materials developed by Dr. Smith for setting up and running similar clinics.

### Virtual support for moms

The MoTHERS Program website offers women a trusted source of information that spans the motherhood spectrum, from pre-conception to post-delivery -- all of the topics doctors cover when talking to women about their pregnancies. The interactive site provides pregnancy update emails, downloadable tools and podcasts, and access to smartphone apps, developed by obstetricians, covering healthy pregnancy, fetal movement, and mothers' and babies' health. It also connects women with community resources offering help with everything from breastfeeding to smoking cessation. And it keeps expectant and new moms up-to-date with news, research updates and an online forum.

[www.themothersprogram.ca](http://www.themothersprogram.ca)





## Technology Evaluation in the Elderly Network: improving care for the frail elderly



An aging population has significant social and economic implications for our country - but more importantly, this demographic shift has revealed the need to improve care for our frail elderly – especially because they are often excluded from research trials and can be subjected to intensive treatments that may negatively affect their quality of life.

The Technology Evaluation in the Elderly Network (TVN) was created to improve care for our frail elderly by fostering and funding the creation of evidence-based best policies and practices, mobilizing knowledge to ensure that these innovations reach patients and families, and training the next generation of highly qualified personnel to care for this vulnerable population.

TVN focuses on the frail elderly across all settings, promoting a collaborative approach that fosters multi-disciplinary, multi-sectoral teams working to develop solutions to improve care.

The Network has provided significant funding for research and training programs, and is actively facilitating new partnerships with key stakeholders to guide the network's national agenda. TVN is co-hosted by Queen's and KGH and funded by the Government of Canada's Networks of Centres of Excellence (NCE) program.

**Learn more:** [tvn-nce.ca](http://tvn-nce.ca)



## The W.J Henderson Centre for Patient-Oriented Research

The W.J. Henderson Centre was founded in 2014 to house a multi-disciplinary hub that brings scientists, treatment teams, patients and families together to improve health care. The Centre fosters a spirit of collaboration and innovation, creating a dynamic environment to attract top scientists who are working to translate their knowledge into new treatments, new health policies and improved clinical care.

### With funding, the Centre will feature:

- Modular research labs that can be shared by several multi-disciplinary research teams to optimize the use of facilities and technology
- Patient-friendly reception areas and observation rooms for overnight studies and clinical trials
- Level 2 biohazard tissue preparation area
- Blood and tissue collection room
- Office and conference space for shared discovery and collaboration



### Help us make discovery happen:

Research at KGH has contributed to globally recognized advancements in gastrointestinal diseases, human mobility, brain and neurological disorders, lung and heart disease, maternal health, allergies, critical care, emergency medicine and end of life care, among others.

Your support ensures that the W.J. Henderson Centre has the facilities, equipment and people needed to continue this tradition of excellent research and innovation. A thriving research enterprise not only generates important discoveries; it also creates greater opportunities for you to take part in the groundbreaking studies that may benefit not only your health, but that of generations to come. Your donations help to ensure that the combined efforts of scientists, their staff and research participants can be translated from the laboratory bench to the hospital bedside. Please help us achieve our goal of “discovery today, treatment tomorrow.”

Learn more from the University Hospitals Kingston Foundation: [uhkf.ca](http://uhkf.ca)