

### Baycrest

@Baycrest  
@RotmanResearch

**BAYCREST:** People may not realize that the brain plays a crucial role in our ability to understand the words spoken to us. Dr. Claude Alain's speech and noise training program aims to treat hearing loss by improving the brain's ability to listen in noisy environments, which becomes more difficult with aging. At least one in four adults over the age of 50 experience hearing problems that lead to difficulty communicating and withdrawal from social activities. Current technology can only amplify sound in our ears, but Dr. Alain's novel intervention targets improving the brain's functionality, leading to less stress, isolation and depression among older adults.



SOINS CONTINUS  
Bruyère  
CONTINUING CARE

@BruyereCare

**BRUYÈRE CONTINUING CARE:** Virtual reality training (VRT) is being used by Bruyère Continuing Care (BCC) and Bruyère Research Institute along the continuum of patient care, from inpatient to outpatient rehabilitation and independent exercise at home. We began by assessing the use of VRT to treat sitting and standing balance, gait, and arm function with stroke inpatients. We then trained the outpatient therapists to use VRT with their patients. Now we are using home-based VRT as daily exercise programs for individuals with cognitive impairment or stroke. This promising technology has the potential to encourage patients to increase the intensity of their rehabilitation and engage in life-long exercise.



camh  
Centre for Addiction and Mental Health  
Centre de toxicomanie et de santé mentale

@CAMHnews  
@CAMHresearch

**CENTRE FOR ADDICTION AND MENTAL HEALTH:** Dr. George Foussias' research aims to enhance recovery in people with schizophrenia using engaging, technology-based tools. The focus is on a symptom with no current, effective treatments: lack of motivation. Once a patient's psychosis is treated with medication, low motivation remains a significant barrier to functioning in daily life. Dr. Foussias' lab has developed a virtual reality (VR) environment and an app that are being studied to both assess and treat motivational deficits. While VR is clinic-based, the app offers a mobile intervention with features including location sensing to track patient goals, such as attending appointments, and supportive feedback messages.



CHEO

@CHEOhospital

**CHILDREN'S HOSPITAL OF EASTERN ONTARIO:** We are witnessing a genomic healthcare revolution where the effective and economical sequencing of our DNA or genome combined with traditional medical data, will help prevent, diagnose and treat disease and promote health. The first to benefit from this transformative approach are the approximately 1 million Canadians affected by the estimated 7000 rare diseases. Typically, they are diagnosed only after years of testing, often involving expensive out-of-country genetic testing. At Care for Rare, we have become international leaders in rare disease diagnoses, using Canadian DNA analysis to more rapidly generate answers bringing increased understanding to the families affected and the possibility of effective therapies.



Hamilton  
Health  
Sciences

@HamHealthSc

**HAMILTON HEALTH SCIENCES:** A ground-breaking project is underway that addresses a major medical shortcoming in Canada and around the world: too many patients develop complications after having cardiac and vascular surgery, and many are re-admitted to hospital after they're discharged. The SMarTVIEW project uses specially-designed, remote monitoring software to extend monitoring beyond the OR to the hospital ward and then to the patient's home for about one week after they've been discharged. The software detects subtle declines in a patient's condition and alerts the health-care team to intervene. At home, monitoring is further enhanced by virtual visits with a nurse, who patients can see on a tablet computer they receive when they leave the hospital. The technology aims to prevent serious complications post-surgery, including infections and blood clots, and to reduce post-surgical emergency room visits and readmissions to hospital.



@HSN\_Sudbury  
@HSNRI



@TBRHSC\_NWO



@HBKidsHospital



Centre des sciences de la santé de Kingston



@KingstonHSC



@lawsonresearch



@hopitalmontfort



@NYGH\_News

**HEALTH SCIENCES NORTH + THUNDER BAY REGIONAL HEALTH SCIENCES CENTRE:** Big data is coming to Northern Ontario. The Health Sciences North Research Institute, Northern Ontario School of Medicine and Thunder Bay Regional Health Research Institute are collaborating on a new Population Health Ecosystem for Ontario's Northern and Indigenous Communities (PHEONICS) – an innovation ecosystem of researchers, industry, clinicians, regulators and patients and their communities that's built on a high-speed computer platform. This population health platform will stimulate research and development on healthcare priorities of direct interest and commercial benefit to Northern populations, as a means to further the broader goals of Northern health equity and economic prosperity.

**HOLLAND BLOORVIEW KIDS REHABILITATION HOSPITAL:** Mixed reality therapy games aim to help children and youth of all abilities reach goals related to their physical wellbeing, and help them practice physical and occupational therapy goals at home, by playing immersive, interactive video games. Developed in research, the mixed reality therapy game Botley's Bootle Blast draws children and youth of all abilities into a robotic city that is in need of assistance. Children and youth visit various themed headquarters that are home to mini-games that each target different therapy goals, including upper body movements, lower body movements, physical activity, and fine motor movements. By playing these mini-games, they have fun while also helping them practice physical and occupational therapy goals.

**KINGSTON HEALTH SCIENCES CENTRE:** We are pioneering new approaches to cardiac ablation techniques and technologies to treat cardiac arrhythmia by advancing the use of hybrid cardiac ablation. Recently performed for the first time in Canada at Kingston Health Sciences Centre by Drs. Gianluigi Bisleri and Ben Glover, this new, less invasive procedure leads to faster healing, reduces or eliminates the need for medication, and reduces future hospital visits.

**LAWSON HEALTH RESEARCH INSTITUTE:** Cancer patients now have more treatment options than ever before. Physicians are therefore faced with complex choices for personalizing treatment. Medical imaging with techniques such as computed tomography (CT) and magnetic resonance imaging (MRI) offers unprecedented potential for prediction of treatment success and early measurement of treatment response. However, the visual patterns that correspond to treatment success or failure are subtle and hard to detect with the human eye. We employ artificial intelligence techniques in machine learning to give the physician a powerful "computational eye" that discerns these subtle patterns to help to support optimal treatment selection for each patient.

**HÔPITAL MONTFORT:** To reduce overutilization and overcrowding of Emergency Rooms (ER), researchers from Montfort have developed a mobile app that can be used by patients or family members to screen common acute medical symptoms. This app will eventually lead to better self-triage of patients from the comfort of their home, help them seek the appropriate service at the appropriate place, and direct them to ER or local dedicated services if symptoms presented could lead to serious medical conditions. This project will also help researchers understand how technology can help patients make better-informed decisions to ultimately improve efficiency of healthcare service delivery.

**NORTH YORK GENERAL HOSPITAL:** In recent years, there has been growing awareness of the risks of potent pain medications known as opioids. Opioid related mortality is a growing public health crisis in Canada, causing over 2400 deaths in 2016 alone. We present three different projects designed to ensure that access to, or disposal of, opioids is appropriate. In two completed projects, we present prototype decision tools to support primary care prescribers and end-of-life patients or families at home. The third project, currently in progress, examines the vulnerabilities in hospital processes that may allow opioid medications to be inappropriately accessed.

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@OttawaHospital  
@OttawamHealth  
@CANImmunize

**THE OTTAWA HOSPITAL:** The Ottawa Hospital mHealth Lab is a multidisciplinary team of clinicians, engineers and scientists developing and evaluating the use of technology in healthcare. Our team creates big data opportunities to guide the improvement of care and to empower Canadians to better manage their health using technology. Our goal is to enhance patient experience, improve health outcomes, and reduce health care expenditures by bringing data to the bedside.



@Providence\_Care

**PROVIDENCE CARE:** Atrial fibrillation (AF) affects approximately 350,000 Canadians each year and accounts for a significant number of Emergency Department (ED) visits. There is emerging evidence to suggest that successful management of certain metabolic risk factors (obesity, hypertension, diabetes mellitus, obstructive sleep apnea) can lead to fewer cardiovascular complications and AF prevention. Our goal is to design a lifestyle modification model that is feasible, reproducible, and sustainable in the long term. By focusing our efforts on patients with a new diagnosis of AF, we will implement strategies upstream along the disease pathway, thus, alleviating the need for pharmacological or procedural intervention altogether.



@TheRoyalMCH

**THE ROYAL:** The Royal's Institute of Mental Health Research is currently conducting innovative research in the areas of mood disorders, anxiety disorders, schizophrenia, youth psychiatry, forensic psychiatry, sleep disorders and neuroelectrophysiology. Investigations in the use and efficacy of complimentary and alternative medicine are also ongoing. As part of the IMHR's continued development, the integration of novel research platforms is being undertaken in the areas of Brain-imaging, Program Evaluation, Population and Community Health and Translational Neuroscience. Together, these platforms will support further growth, development of critical mass in key areas and ultimately, improvements in the delivery and effectiveness of clinical care.



@SickKidsNews

**SICKKIDS:** The long-term function of transplanted kidneys depends on early events around the time of transplantation. The gap between the number of donor kidneys available for transplantation and the number of patients needing transplants continues to grow. Conventional methods for storing donor kidneys before transplantation involve static storage using cold solutions. Newer evidence suggests that storing kidneys using perfusion at warmer temperatures may improve their function after transplantation. This new preservation method may also increase the number of kidneys suitable for transplantation.



@SinaiHealthTO

**SINAI HEALTH SYSTEM:** As a way to address the scarcity of organs available for transplant, a team of stem cell researchers under the leadership of Dr. Ian Rogers is working to generate patient-matched transplantable kidneys. The lab is using a pig kidney, removing all of its cells, and then repopulating the structure of the kidney with pluripotent human stem cells (iPSC), using a negative pressure bioreactor. Following cell-repopulation, the bioreactor can be used for organ culture. Preliminary studies have determined that they can successfully repopulate the pig kidney matrix with human cells and grow the organ so the cells can mature. Testing to determine function is ongoing.



@stjoeshamilton

**ST. JOSEPH'S HEALTHCARE HAMILTON:** The Integrated Comprehensive Care (ICC) project is an innovative patient-centered model of care that directly integrates hospital and community care services – creating a smooth transition for patients from hospital to home and has been tested across a number of clinical disciplines. Designed by the St. Joseph's Health System, the program pairs patients with a single Care Coordinator — usually a registered nurse — who coordinates a multidisciplinary team to provide service from pre-operation treatments to post-surgical home care. Research conducted on the ICC project pilot in thoracic surgery has demonstrated that ICC results in a shorter hospital stay, significantly fewer readmission and ER visits, significant cost savings and no increase in adverse post-discharge outcomes after major chest surgery.

## St. Michael's

Inspired Care.  
Inspiring Science.

@StMikesHospital

**ST. MICHAEL'S HOSPITAL:** Half of Emergency Department patients who need to be admitted will stay in General Internal Medicine (GIM) wards. In fact, GIM patients represent 25% of all hospital bed days. GEMINI is a data-driven network for GIM patients in Ontario. This truly collaborative project extracts and standardizes data from 140,000 GIM patient stays at seven large hospital sites over a five-year span. The research team has shown that they can rapidly analyze these data and has identified important opportunities to improve patient care and reduce costs. And because GIM makes up such a sizeable percentage of hospital stays, improvements in this hospital department can have profound health-system impact.



@Sunnybrook

**SUNNYBROOK:** Focused ultrasound is a breakthrough technology that exploits the power of sonic energy for therapeutic effect. Sunnybrook Research Institute has the largest focused ultrasound program in the world. In 2017, we launched a first-in-human clinical trial using focused ultrasound to open the blood-brain barrier in people who have Alzheimer's disease. This pioneering approach shows promise to solve what once was deemed an impossible problem: getting therapies safely and directly into the brain. Visit our display to speak with the neurosurgeon leading this and similar trials, and the neuroscientist who is pairing antibodies, genes and stem cells with the technology to devise ways to treat brain diseases that have few, if any, options.



@UHN\_News

**UNIVERSITY HEALTH NETWORK:** The bone marrow cancer, multiple myeloma, is currently diagnosed and monitored by using a large-bore needle to puncture muscle and bone to collect cancer cells. As an alternative to this painful procedure, we have developed a blood test that sequences cancer DNA that is shed into the bloodstream by myeloma cells. Since the test requires only a simple blood sample, we are able to test patients more frequently and with less pain than bone marrow aspirates. We are now using this test in several ongoing clinical trials across Canada with the goals of personalized treatment and disease monitoring.



@WCHospital  
@WCRInstitute

**WOMEN'S COLLEGE HOSPITAL:** Women's College Hospital is bringing accessible BRCA genetic testing to Canadians through The Screen Project. The project offers genetic testing for BRCA1 and BRCA2 mutations, which increase the risk of breast, ovarian, prostate and other cancers. Individuals who are identified as mutation carriers are offered a follow-up appointment with a genetic counsellor at Women's College Hospital to review their results. The study aims to determine the feasibility of guided direct-to-consumer population-based genetic testing for the BRCA1 and BRCA2 gene mutations and estimate the number of cancers that such a program could prevent.

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