



ACCELERATING CHANGE

THROUGH TECHNOLOGY & INNOVATION

**ANNUAL REPORT
2013-2014**

THE ROYAL'S INSTITUTE OF MENTAL HEALTH RESEARCH
PROUDLY AFFILIATED WITH THE UNIVERSITY OF OTTAWA



Mental Health - Care & Research
Santé mentale - Soins et recherche

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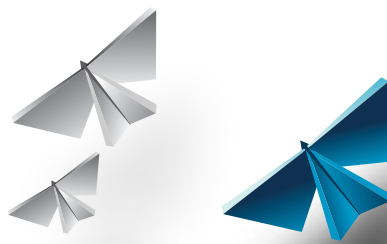
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IMHR At A Glance

The Royal's Institute of Mental Health Research (IMHR) was established in 1990 by the Royal Ottawa Health Care Group and the University of Ottawa. As a leading academic health science centre, we are developing leading-edge multidisciplinary research and training programs with the ultimate goal of fostering innovative ways of treating mental illness.

Mission

To create scientific knowledge to improve mental health and well-being locally and globally.



Vision

To be a premier research institute with national and international centre of excellence status that continuously improves mental health and well-being through leadership, collaborative discoveries and innovation in research, patient care and education.

Values

Excellence, collaboration, integrity, respect, compassion, wellness and equity.

The Year in Numbers ...

Researchers (Scientists, Associate Scientists, Clinical Investigators)	40
Adjunct Scientists and Visiting Scholars	11
Research Trainees	104
Research Support Staff	59
Volunteers	54
Peer Reviewed Publications	125
Books and Chapters	13
Research Grants and Contracts	84
Research Space:	
Finished Research Space	23,000 sq. ft.
Future Brain Imaging Suite (shell)	4,400 sq. ft.
Clinical research projects during reporting year	73
Basic research projects during reporting year	34



Message from The Royal's IMHR's President and CEO and Chair of the Board of Directors

The focus of our research is to leverage innovative technology to significantly accelerate positive outcomes for those suffering from mental illness.

Mental illness takes an enormous toll on our society in terms of emotional, social and economic costs. Depression is the leading cause of disease burden in Canada and suicide is the second leading cause of death of our youth. Yet only about 5% of research funding is directed to mental health research.

At The Royal's IMHR, our research is focused on seeking outstanding technological innovations that can help us diagnose mental illness early and develop the personalized treatments that definitively transform lives.

Essentially, we want to do for mental illness what medical and scientific technology has achieved for heart disease in just a few decades. Thanks to these advances, today there are over 60% fewer deaths from heart disease, and a vastly better quality of life for those affected by the disease. In this era of "biological psychiatry," where we are achieving ever-new levels of understanding of brain function, we are aiming to bring this degree of success to the realm of mental health.

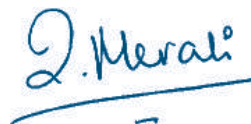
In pursuit of that goal, our research team is at the leading edge of some very exciting work with technological tools of the first rank. These next-generation diagnostics will enable us to understand "mental disorders" as "brain disorders" in far greater depth. For example, the unique Brain Imaging Centre soon to be established at The Royal will allow researchers not only to identify *where* brain functioning is going awry, but also *what* biochemical process is driving that change. These findings hold tremendous promise for early diagnosis of depression, as well as personalized treatment approaches. Based on brain responses, we will be able to predict treatment responses within days, rather than the weeks it now takes when we look at patients' symptoms.

In partnership with IBM, we aim to use real-time analyses of patients' EEG signals to detect depression and rapidly determine whether a particular drug suits an individual. Moreover, by combining EEGs and brain imaging, we can pinpoint abnormal brain circuits in patients who have been immersed in a virtual environment designed to evoke specific responses. These two methodologies have the potential to give us more precise guidance in future diagnostics and treatment selection.

Nor are we forgetting the enormous power of outreach in the ever-evolving world of mobile technology. Along with our partners, The Royal has launched several "apps" for mobile devices: one to help students better manage their emotions and cope with stress, and another to aid our veterans and serving forces members to deal with operational stress injuries. In addition, we continue to expand and refine the use of web-based e-therapies, and of telepsychiatry, to deliver much-needed services to remote communities.

In yet another technological advance, we are exploring in partnership with the Ontario Brain Institute, the use of a world-unique robotically guided rTMS (repeated transcranial magnetic stimulation) device to treat depression. The magnetic field generated by rTMS can penetrate the brain, in a non-invasive and painless way, to stimulate or inhibit specific brain circuits. We are very excited about this approach and its promise for treating various conditions, including depression and post-traumatic stress disorder.

As highlighted by the stories and testimonials in this Annual Report, we continue to be wholly committed to excellence in research and its translation to clinical care, together with the mentoring and training of next-generation researchers. With the help of the world's leading technological innovations, we will apply our combined expertise to infuse light and hope back into patients' lives, and implement faster and more effective research-informed care than ever before.



Zul Merali
President and CEO



Roxanne L. Anderson
Chair



The PET-MRI Imaging Machine: Unraveling the mysteries of the final frontier

The brain is the last frontier in medical science. Probing its secrets has been challenging, as the brain is more complex than our galaxy. Furthermore, it is not easily 'reachable or palpable' as it is vaulted away behind the bony skull.

The window to the brain will be opened to us when the IMHR acquires a state-of-the-art PET-MRI imaging machine, the only one to be devoted solely to brain and mental health research in Canada. "The combination of the two technologies — PET (positron emission tomography) and fMRI (functional magnetic resonance imaging) — will help map the brain's neuronal and biochemical activities in a unique way," explains Dr. Georg Northoff, Director of the Mind, Brain Imaging, and Neuroethics Clinical Research Unit.

Dr. Northoff will be working with Dr. Pierre Blier, Director of the Mood Disorders Clinical Research Unit, as well as other clinicians and scientists at The Royal, to examine the effects of various drugs used to treat depression, post-traumatic stress disorder (PTSD), and other mental illnesses on brain functions. More specifically, by studying the brains of individuals with various disorders and comparing them to 'healthy' brains, they will be able to identify malfunctioning brain circuits for each type of disorder or symptom, and also analyze the brains' responses to specific drugs.

Dr. Northoff explains: "There are different forms of depression, and we know that anxiety disorders (such as PTSD) are closely associated with depression. The imaging machine will help us detect specific neural and biochemical features of depression and related conditions. Similarly, major strokes and so called "silent strokes" are closely linked to depression and dementia; depressed elderly for instance, are more likely to develop dementia. This technology will help us monitor brain health and vulnerability. If, through the imaging technology, we could determine a person's predisposition to experience a stroke and/or dementia, we could mitigate the risk by implementing preventive strategies. With respect to Alzheimer's, the PET-MRI is able to detect the plaques and tangles that are the telltale signs of this disease."

"This unique tool will give us new insight into the living brain."
— Dr. Georg Northoff

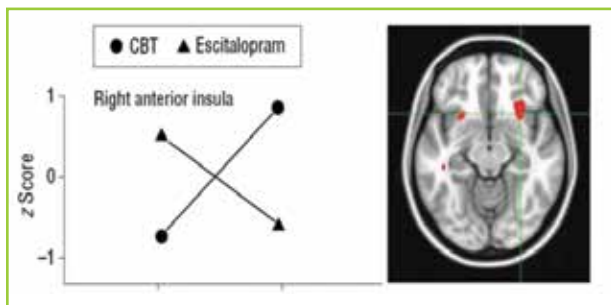


Denis Trottier, Chartered Professional Accountant and Partner with KPMG Enterprises, Ottawa

My testimonial in support of the work accomplished by the IMHR is a very personal one. Over the years, I have experienced bouts of clinical depression that would hit me out of the blue, and that got progressively worse each time. I tried several medications, psychological counselling and saw a psychiatrist, but nothing was really helping me. Then my psychiatrist referred me to the IMHR where I saw Dr. Pierre Blier. He worked with me to find the right combination of medications that helped me get back to my original self. I am happy to share that, "Dr. Pierre Blier saved my life."

Currently, the only way to confirm that a person had Alzheimer's is through an autopsy where the brain can be examined under a microscope.

Once the PET-MRI is up and running, teams of researchers will be conducting studies using a variety of interventions (e.g. drugs, psychotherapy, neuromodulation, etc.). Additionally, they will be simultaneously peering into the living brain, in real time, to reveal if and how those interventions are working.



The brain activation pattern can potentially help personalize the selection of drug therapy versus psychotherapy (Mayberg et al., JAMA Psychiatry, 2013;70(8): 821-829).

"The most important thing for patients, who are often in a state of crisis," says Dr. Blier, "is to have rapid access to imaging capability. We need to start treatment promptly, however, it becomes impossible to do this if we don't have direct access to a scanner that will provide us with information about how the person will respond to a certain treatment. We want predictors of response, and scanning is going to help us acquire these predictors."

Both Drs. Northoff and Blier are excited about the ability the new scanner will have to help them develop methods for speedier diagnoses and treatments. "Once we get our results from our research studies, we will be able to apply this knowledge in a clinical setting," says Dr. Blier.

"Once the clinical trials are completed, ultimately, with three pieces of information — the imaging, the EEG and the genotype (the person's biomarkers) — we will be able to select the most effective treatment for each individual. This will help improve remission rates and shorten the painfully long periods currently required to find the most appropriate treatment for individuals."

– Dr. Pierre Blier

Pierre Gosselin, Director and Associate Dean, School of Psychology, University of Ottawa

The School of Psychology at the University of Ottawa is delighted to partner with the IMHR on the highly innovative PET/MRI initiative. This extraordinary state-of-the-art technology will give our multidisciplinary researchers access to the finest brain imaging capability available anywhere, and enable us to engage in a whole new realm of research. The scanner will play a critical role in training our next generation of researchers and also help us recruit imaging researchers of the highest calibre from around the world. We welcome the opportunity to embrace a partnership with the IMHR to advance our understanding of how brain circuitry impacts mental illness and behavior.



DONORS ARE OUR PARTNERS

"The possibilities for excellence are endless when community and corporate leaders align their generosity to support causes like ours. Seventy-four per cent of The Royal's \$25 million Campaign for Mental Health is dedicated to advancing discovery and innovation through research. We are so grateful to the early supporters listed below who have donated between \$250,000 and one million dollars each in support of The Royal's research vision. Their inspirational involvement will motivate others to follow their lead. We are at the cusp of becoming a national model of excellence in depression research and brain imaging, thanks to this philanthropic leadership. The human impact will be transformational to people and their families as we improve and save the lives of so many who continue to suffer. This is inspiration worth supporting. Are you with me?"

– Andrée Steel

President and CEO, The Royal Ottawa Foundation for Mental Health

OUR DONORS

- Rob Ashe & Sandra Herrick
- Barbara Crook & Dan Greenberg, Danbe Foundation
- BMO financial Group
- Britton Smith Foundation
- Doyle Homes Ltd., Trevor Doyle
- Elizabeth Graham
- Great-West Life Assurance Company
- John and Jennifer Ruddy, Trinity Development Foundation
- Kathleen Grimes
- Lift Foundation
- Michael Potter
- Riocan Real Estate Investment Trust
- Tony Graham Automotive Group



PTSD's complexity informs research and treatment at the OSI Clinic

Post-traumatic stress disorder (PTSD) is a complex disorder that is difficult to treat. "People with PTSD not only have the classic symptoms of this disorder, but also commonly have symptoms of major depression, general anxiety disorder and/or substance abuse," says Dr. Alexander Neumeister, a professor in the departments of psychiatry and radiology and the Director of the Molecular Imaging Program for Mood and Anxiety Disorders, New York University Langone Medical Center.

The client profile at The Royal's Operational Stress Injury (OSI) Clinic bears this up: 70% of the clients who are seen have PTSD, and of those, 65% also have depression, anxiety and other comorbidities.

Given its complexity — and that people with PTSD either present with anxiety disorders or with depression and emotional numbing — it is crucial that each client be assessed and treated individually, based on the best available research. "We decide what to treat first based on the client's profile," explains Shelley Hale, the Clinic's Manager of Patient Services.

Two treatment approaches are offered at the Clinic depending on the profile: for anxiety-based PTSD, prolonged exposure, cognitive processing therapy and eye movement desensitization

are the standard treatment approaches; for depression-based PTSD, cognitive behavioural therapy is used.

Given that no single drug treatment targets PTSD, these methods are currently the gold standards for treating PTSD.

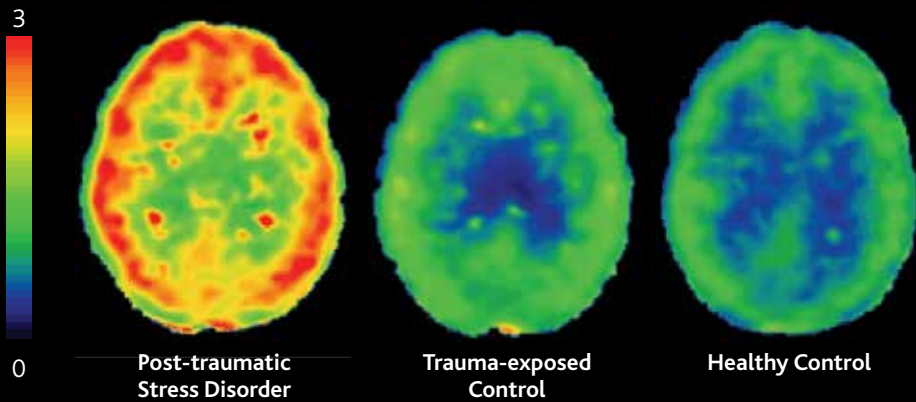
Dr. Neumeister explains: "The disorder may look like depression, but it is not classic depression. It's often easier to take medication, but the medications that are available are anti-depressants, which do not work well in alleviating all PTSD symptoms."

But thanks to research being conducted by Dr. Neumeister, there may be a novel pharmacological intervention for PTSD on the way soon.

Dr. Neumeister has been studying the neurobiology of PTSD in order to develop the next generation of drug treatments designed specifically for PTSD. Using state-of-the-art PET-MRI brain imaging, he has been conducting preclinical studies, including using a harmless radioactive tracer that illuminates the CB1 receptors. The CB1 receptors normally interact with specific signalling molecules in the brain and play a role in memory formation, appetite regulation, pain tolerance and mood.

"I have felt alone over the past few years fighting my demons, but since the OSI app was launched, I no longer feel alone - no matter where I am, there is always help within arm's reach. I take the opportunity to tell others about the app and what it can do. This app lets us know that we are not forgotten and that there are kind people like you that do care."

— Paul



Elevated brain cannabinoid CB1 receptor availability in post-traumatic stress disorder: a positron-emission tomography (PET) study (Neumeister et al., *Molecular Psychiatry* (2013), 1-7)

His findings show there is a biological explanation for PTSD — people with the disorder have markedly lower concentrations of at least one neurotransmitter that plays a role in reducing anxiety. Three drug compounds heading to clinical trials within the next six months in the U.S. bolster hope for PTSD sufferers.

Given that Dr. Neumeister’s work has shown there are clear biological markers for PTSD, tests for CB1 receptors could dramatically improve the diagnosis and treatment of people with PTSD who come to the OSI Clinic.

“We’re very excited about the PET-MRI machine that the IMHR will be acquiring at The Royal. It will provide an opportunity to further collaborate with other researchers at the IMHR and build on the science behind PTSD,” says Shelley.

In the meantime, clinicians at the OSI Clinic are collaborating with the Sleep Research Clinic to assess the effectiveness of a number of non-pharmacological interventions in improving outcomes. These include: the effectiveness of mindfulness-based stress reduction over cognitive behavioural therapy for insomnia; and the use of virtual reality for people who have experienced significant traumas.



OSI CONNECT REACHES OUT TO CLIENTS AND FAMILIES

The OSI Clinic treats veterans and members of the Canadian Forces and the Royal Canadian Mounted Police who live in Ottawa and surrounding areas, including parts of western Quebec, Peterborough, Pembroke and even Nunavut. To augment its services, the Clinic launched OSI Connect (a free mobile application) in June 2013, with the support of Veterans Affairs Canada. This mental health learning and self-management mobile app (which offers assessments, videos and information) is designed to help OSI clients and their families understand the nature of operational stress injuries. The resources on OSI Connect address challenges including post-traumatic stress and triggers, depression, anger, sleep problems, substance abuse and stress management. The app is compatible with various iPhone type devices.

SAFELY RE-EXPERIENCING TRAUMATIC EVENTS THROUGH VIRTUAL REALITY

Scott is a retired member of the Canadian Forces and a former PTSD sufferer. Medication was not working for him and in 2008 he sought help at The Royal’s OSI Clinic. Through virtual reality, he relived the trauma to help desensitize his responses to the trauma — and eventually was cured. “The first five or six times, it was pretty intense,” says Scott. “It wasn’t a memory; it was as if I was reliving the experience. But the more I went through virtual reality desensitization, the more the experience became a memory.” Each episode lasted an hour, followed by a 30-minute debriefing. It took about 12 treatment ‘episodes’ for Scott to feel well again.



From left to right: *Back row:* Dr. Luis Oliver, Anne Bailliu, Dr. Sarah Bertrim, Alasdair Gillis, Faye Bryers, Dr. Michele Boivin, Kelly Christie, Dr. Bob Bialik
Front row: Shelley Hale, Dr. Jakov Shlik, Dr. Raj Bhatla



rTMS

One more technology to fight depression

"We need all the help we can get in the fight against depression," says Dr. Zul Merali, IMHR's president and CEO.

Enter rTMS — repetitive transcranial magnetic stimulation — a relatively new technology in Canada (it was first approved for use in 2002) and one that the IMHR will be acquiring this July. This rTMS system will be the most advanced version, using imaging-guided and robotically placed coils for brain stimulation.

"rTMS is an exciting option for people who are not responding to antidepressant drugs, or cannot tolerate these medications (e.g. elderly people with kidney or liver problems). This option may also be a viable alternative for those requiring electroconvulsive (shock) therapy (ECT). Even for people who have undergone a successful acute course of ECT, rTMS could potentially be used to help them

remain well," says Dr. Marcelo Berlim, director of the Neuromodulation Research Clinic at the Douglas Institute in Montreal and an assistant professor in McGill University's department of psychiatry.

"rTMS is better tolerated and more acceptable because it is less invasive. ECT involves using general anesthesia and is often associated with cognitive or memory deficits," says Dr. Berlim."

So how does rTMS therapy work? In brief, a coil (shaped like a figure 8) is placed on the scalp, typically above the left dorsolateral

"In treating youth for depression our options are quite limited. Health Canada warns (June 2004) that youth taking antidepressant drugs "may experience behavioural and/or emotional changes that may put them at increased risk of self-harm or harm to others" (Health Canada website). For our youth (where access to drug treatment is limited) and for the elderly (whose poor kidney or liver function may limit the use of drugs), rTMS as a non-drug intervention may be very useful."

— Dr. Zul Merali

prefrontal cortex. Very rapid electrical pulses released by the rTMS device produce magnetic fields that cross from outside of the skull into the brain, almost unimpeded. These magnetic fields interact with the brain's neurons and influence their activity. "Electricity is converted into electromagnetic fields and then re-converted into electricity in the brain," explains Dr. Berlim. So how does this help someone who is depressed? The left front part of a depressed person's brain usually has slower brain activity than normal; rTMS therapy 'accelerates' brain cell activity.

Results from a comprehensive review of the literature reveal that symptoms of depression are alleviated in about a third of the cases and complete remission is seen in around 20%; this compares favourably with results attained through medications. "These results were obtained after an average of only 12 daily sessions, which is quite impressive," says Dr. Berlim. Some patients come back for maintenance therapy for 6 to 12 months. "Other than ECT and ketamine, we don't have any other interventions that can produce such an effect in such a short time. With fewer or no side effects, rTMS might just be the answer for some patients."

"When it comes to mental health, there are limited treatment options," says Dr. Merali. "By acquiring rTMS equipment, we will be expanding our toolbox further to battle depression."

"rTMS introduces a different way of tackling depression. Psychotherapy is long and can be expensive; medications can cause side effects; ECT requires anesthesia and is more invasive; but rTMS lets you target specific area(s) of the brain, in a safe and effective manner, to alleviate depressive symptoms."

– Dr. Marcelo Berlim

Donald Stuss, President and Scientific Director, Ontario Brain Institute

The Ontario Brain Institute (OBI) aims to draw the province's brain researchers, clinicians, industry, patients and their advocates together into seamless, convergent partnerships. OBI helps bridge the gap between industry and academia by providing training programs for highly-qualified scientists, enabling entrepreneurial opportunities, and helping to develop neuroscience-related companies in Ontario. We are particularly enthusiastic about the use of technology to improve mental health outcomes. Specifically, we are interested in testing the effectiveness of repeated transcranial magnetic stimulation (rTMS) in treating depression. In fact, the CEO of NeuroQore, a company specializing in rTMS, was funded through the OBI/OCE Entrepreneurial fellowship. I would like to congratulate the IMHR on its incorporation of this technology into its diversified and dynamic treatment program.



LINKING TECHNOLOGY to INNOVATION

Imaging



Imaging techniques allow researchers to peer into a living, working brain — providing a better understanding of the underlying causes of depression and other mental illnesses, seeing how a patient responds to a given treatment, and tailoring treatment to that patient.

– Dr. Zul Merali

Virtual Reality



A person who has experienced major trauma and who is exposed to reminder cues (or situations) through virtual reality can learn to blunt the emotional reaction to past trauma. Virtual reality can be used to simulate many situations and is being used effectively to treat anxiety disorders, phobias and post-traumatic stress disorder.

– Dr. Jakov Shlik

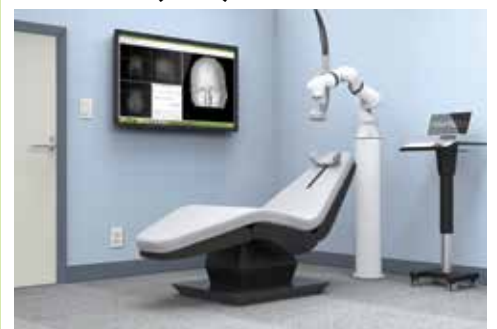
Electroencephalography (EEG)



A depressed person's brain is different from that of someone who is not depressed. Electroencephalography (EEG) activity is being used to detect depression; monitor the response to various treatments; and, ultimately, develop the best treatment therapy for a patient.

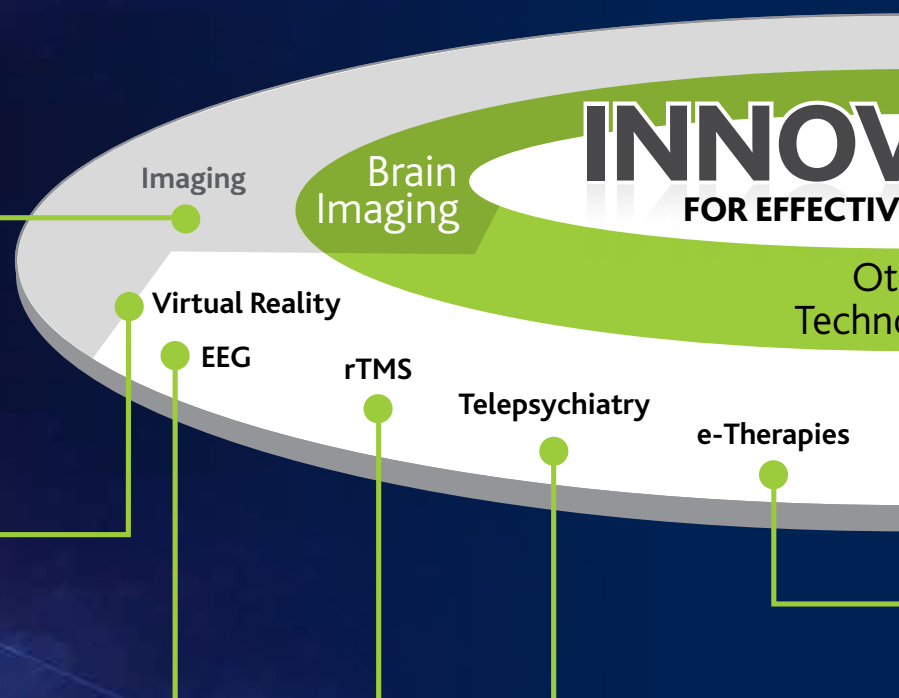
– Dr. Verner Knott

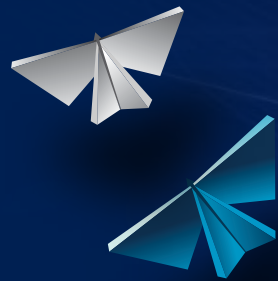
Repetitive Transcranial Magnetic Stimulation (rTMS)



The IMHR is gearing up to offer rTMS as one more therapy alternative for treating depression. This form of treatment is especially suitable for people who do not want to take, or cannot tolerate, anti-depressants, or for those for whom electroconvulsive therapy is the only alternative.

– Dr. Zul Merali





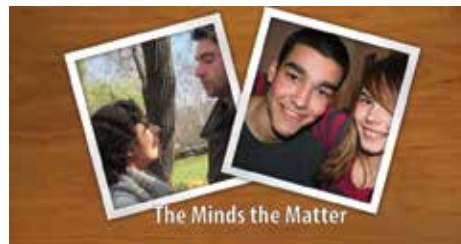
OSI Connect App



OSI Connect is a mobile app that provides Canadian veterans, Canadian Armed Forces members and RCMP members and their families with information about Operational Stress Injuries (OSI). It not only guides access to the OSI Clinic but also provides help with self-assessment and information to families and community practitioners.

– Shelley Hale

The Mind's the Matter



The Mind's the Matter is an online awareness and information tool for military families coping with an operational stress injury. Families can explore a number of topics — such as managing feelings, dealing with parental anger and understanding changing family roles — to help them understand OSI.

– Laurie Ogilvie

INFORMATION TREATMENT

Other
Technologies

Mobile
Apps

Universities

Networks
(eg. CDRIN)

Partnerships

Department
of National
Defence and
Veterans
Affairs

Research
Institutes

Ontario
Brain Institute

Telepsychiatry



With support from Bell Canada for its Telepsychiatry Program, The Royal is reaching more people who live in rural and remote areas. By substantially reducing their travel time for a consultation, patients now have access to specialized mental health services.

– Dr. Raj Bhatla

Healthy Minds/Mobile World App



HealthyMinds is a mental wellness app for mobile devices, designed to help youth better manage their emotions and cope with stress.

– Nicole Loreto

e-Therapies

With funding from the Canadian Institutes of Health Research, clinicians with extensive clinical experience in electronic web-based therapy (e-therapies) are set to study whether people undergoing e-therapy get better sooner and need fewer face-to-face services than those provided with just information about online resources.

– Dr. Simon Hatcher

Dr. David Park, Director of the University of Ottawa Brain and Mind Research Institute

At the University of Ottawa Brain and Mind Research Institute (uOBMRI), we strive to promote quality brain health and comprehensively treat brain disorders. We are therefore very pleased to partner with the IMHR to foster research in mental health. We applaud The Royal's, and the IMHR's, determined and inspired focus on depression and the development of evermore effective treatments, a research priority we share at the uOBMRI.





From the shamans of Costa Rica to research labs in Ottawa: In search of plants that reduce anxiety

The shamans of Costa Rican forests who live in close harmony with the plants may be onto something. Famous for using plant medicines for a variety of ailments, they even use plants to cure what they call effects of witchcraft.

Curious about the symptoms of those natives affected by 'witchcraft', Dr. Zul Merali, President and CEO of the IMHR asked colleague Dr. John Arnason, an ethno botanist, to explore further. He discovered that the symptoms of 'witchcraft' described by the shamans were very similar to what we refer to clinically as anxiety disorders in North America.

And so the investigative journey began. Dr. Arnason brought back plant specimens the shamans use to cure witchcraft. Dr. Merali's team took extracts from the plants and conducted preclinical studies using animal models of anxiety. "Interestingly, one of the extracts of a particular plant - *Souroubea sympetala* - had very powerful anti-anxiety effects," says Dr. Merali.

Fellow colleague Dr. Tony Durst, an organic chemist, then began to analyze the plants' extracts in an attempt to identify the distinct chemical components of the plant extract. During the course of testing the individual components, the team was able to identify specific chemicals in the plant extract that were directly responsible for the anti-anxiety effects. One chemical compound in particular appeared to be most responsible for alleviating anxiety — betulinic acid.

"We are finding that this chemical works better in the presence of other chemical components of the plant, namely the class of compounds called the amyryns," explains Dr. Merali.

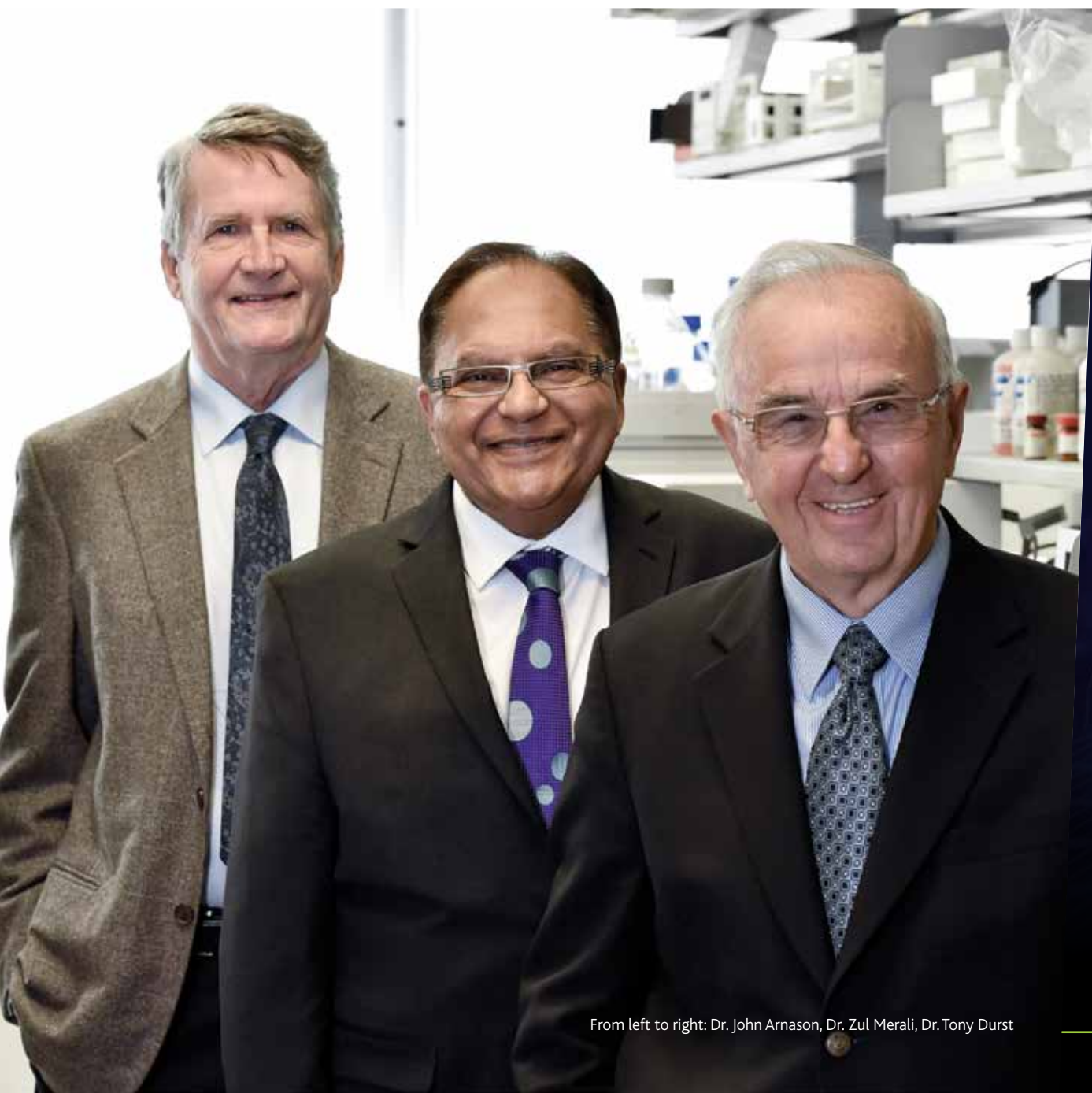
"In our preclinical studies, we find the plant extracts to be very safe, as we have not seen any long-term adverse effects — which bodes well for future human trials."

— Dr. Zul Merali

Dr. Merali and his colleagues have found that not only do these compounds alleviate the behavioural symptoms of anxiety, but they also blunt the release of stress hormones (cortisol or corticosterone) in the body. More recently the protective effects of these compounds are being assessed in an agricultural context, for instance in young pigs that are being weaned from their mothers and transported. In this situation the animals become nervous and stressed, however, administration of this compound can profoundly decrease the levels of their stress and mortality.

Similarly, fish that are bred in captivity also show high levels of stress — which ultimately affects food quality. “Here is another potential area of use that we are considering,” says Dr. Merali.

And, when it comes to humans, Dr. Merali believes the compound could potentially be useful in alleviating various forms of anxiety disorders, including post-traumatic stress disorder (PTSD). “Once we’re satisfied with the animal trials, we hope to start human trials within two years. If the plant-derived compounds are effective in humans, it would be a breakthrough.”



From left to right: Dr. John Arnason, Dr. Zul Merali, Dr. Tony Durst



Young researchers running ahead with the 'Olympic torch' of research

Young researchers at the IMHR are inspired to carry on the research 'torch,' thanks to a range of educational and training opportunities. Over 70 graduate- and postgraduate-level trainees and over 30 undergraduates are mentored by a core group of scientists of international repute.

Young Researchers' Conference

The annual Young Researchers' Conference attracts over 200 young researchers from Ontario and Quebec who work in psychology, psychiatry, neuroscience, social work and nursing. They come together to network and partake in lectures delivered by their cohorts as well as esteemed researchers and scientists. The 2014 conference, held on June 6th in collaboration with the Ottawa chapter of the Society for Neuroscience, focused on the impact of stress on life and health. Lecture topics included changes in the brain and behaviour induced by stress, trauma and bullying. Various treatment options, including cognitive behavioural therapy, were also discussed.

The conference is part of the IMHR's Young Researchers' Forum, which was created to promote knowledge exchange and collaboration among young researchers who are studying in the field of mental health.

Another educational opportunity — new in 2014 — is the Food for Thought trainee presentation series (see sidebar).

IMHR Graduate Student Research Awards

New this year are the IMHR Graduate Student Research Awards. With the support of the Jennie James Depression Research Fund, Allison Lees Depression Research Fund, Louise Helen Waddington Research Fund and Royal Ottawa Foundation for Mental Health, annual awards are provided to promising graduate-level students working in depression research at the IMHR. This year's winners were: Sara de la Salle, an MA candidate at the University of Ottawa's School of Psychology, who is looking at the antidepressant response to ketamine infusion; Eliza Ali, an MSc candidate at Carleton University's Department of Neuroscience, who is looking at ghrelin in an attempt to link obesity and depression; and Chris Oosterhof, a PhD candidate at the University of Ottawa's Department of Cellular and Molecular Medicine, who is studying the acute effects of brexpiprazole on serotonin, dopamine and norepinephrine neuronal activities.



Amanda Helleman and Veronique St-Onge

IMHR Young Investigator Awards

Each year two young researchers are honoured with an IMHR Young Investigator Award; one in clinical research and one in basic science research. Each award comes with a cash prize of \$1,000, which the winners use to attend a scientific meeting(s) of their choice. This past year's winners were Amanda Helleman and Véronique St-Onge.

Amanda is studying for a master's degree in educational counselling at the University of Ottawa. Her clinical research, conducted in the Mood Disorders Clinic, involved 216 children who have a parent with bipolar disorder and 87 children who do not. The results confirmed there is a genetic link to bipolar disorder. As someone with anxiety disorder, Amanda is interested in the field: "Being diagnosed when I was 14 made me curious as to how disorders like anxiety and mood disorders develop," she says.

Véronique is doing a PhD in neuroscience at Carleton University. She was recognized with the basic science award for her work in the lab studying a particular hormone made by the stomach called ghrelin, and its link to the motivation to eat. "A high-sugar diet has an effect on the brain. If you feel better, it activates the reward system, which helps cope with stress — and then it becomes a cycle," she says. "A greater understanding of ghrelin signalling might help to prevent obesity that is caused by over-eating rewarding foods," she adds.



From left to right:
 Back row: JD Lees, John Waddington, Ben James, Margaret James and Chris Oosterhof
 Middle row: Renee Morra, Pamela Waddington, David Lees and Sara delaSalle
 Front row: Lee Ann Lees, and Eliza Ali

FOOD FOR THOUGHT

The newly initiated Food for Thought series is designed to provide just that — food for thought for young researchers working in both basic and clinical research. The monthly series, comprising two presentations, serves to:

- provide an informal venue for communicating current thesis research work to other trainees associated with IMHR projects;
- facilitate constructive critical discussion of new ideas, methods or published interpretations;
- offer opportunities to refine future conference presentations in a supportive environment;
- strengthen awareness among trainees of the diversity of research being undertaken at the Institute; and
- initiate conversations among basic and clinical young researchers.

The series is coordinated by Joelle Choueiry (a trainee representative) and Dr. Keith Busby, Research Ethics/Scientific Review Coordinator.



From left to right: Col. (Dr.) Rakesh Jetly, Col. (Dr.) Eric Vermetten, Phil Upshall, Louise Bradley (Chair and CEO, Mental Health Commission of Canada), Dr. Zul Merali, Bill Wilkerson

The CDRIN: 1 + 1 = 4!

When the sum of the parts is greater than the whole

Think of a wheel whose spokes emanate from the centre: together they give the wheel's circular form the ability to accelerate forward and the strength to work as one unit. Now think of a network of researchers, clinicians and patients or clients, seamlessly interconnected through a similar 'hub and spoke' model, where experts from each hub collaborate, network and promote highly interactive research devoted to advancing the diagnosis and treatment of depression. That is what the CDRIN (Canadian Depression Research and Intervention Network) stands for.

The Government of Canada has allocated \$5.2M to launch CDRIN, in partnership with the Mental Health Commission of Canada, the Mood Disorders Society of Canada and The Royal's IMHR. Since the recent launch of CDRIN the progress has been palpable, rapid, and exciting. Through the patient-focused depression research and intervention hubs, the network: links leading scientific research and clinical minds working in mental health across Canada; trains the next generation of young researchers to work across the

country and across disciplines; and brings people with lived experience and scientists together as 'partners in research'.

"The network will accelerate and transform mental health research and care," says Dr. Zul Merali, founding Scientific Director & Co-CEO, CDRIN. "It provides a 'super highway' connecting the best minds in depression research and care. The fields of cancer and cardiovascular diseases have benefitted enormously through such collaborative efforts."

"Through CDRIN we want to ensure that we measure the same 'vital signs' of depression across the Nation, allowing us to compare results and pool data through a

"I can speak for my entire family when I say mental health is a lifelong practice. I want to be part of the national effort to reduce stigma and show that mental illness is a matter of health like any physical disease. Today through advances in both diagnosis and treatment we can provide much more effective care."

« Je parle pour toute ma famille lorsque je dis que la santé mentale, c'est l'histoire d'une vie. Je veux participer à l'effort national pour réduire les préjugés et montrer que les maladies mentales sont des enjeux de santé au même titre que les maladies physiques. Aujourd'hui, grâce aux avancées sur le plan du diagnostic et du traitement, nous offrons des soins plus efficaces ».

— Her Excellency Sharon Johnston, C. C.



Photo credit: Sgt Ronald Duchesne, Rideau Hall
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National Registry. We will conduct large multi-site studies to obtain robust results that will lead to transformative research-informed care and will change the way we train the next generation of researchers and clinicians," says Dr. Merali.

In March 2014, CDRIN hosted its inaugural conference in Ottawa. This exciting conference was opened by Her Excellency Sharon Johnston, and was attended by over 250 participants, including scientists, people with lived experience, clinicians, trainees, etc. Honourable Lisa Raitt addressed the conference on behalf of the Government of Canada. At the conference, the first three CDRIN Depression Hubs were launched: the Alberta hub (linking experts in Edmonton, Calgary and Lethbridge); a Maritimes hub at Dalhousie University (linking regional Universities and health authorities); and a Central Canada Hub (linking The Royal's IMHR, University of Ottawa, Carleton University, the Centre for Addiction and Mental Health (CAMH), University of Toronto and the London Health Sciences Centre). Additional hubs will soon be launched in British Columbia, Ontario and Quebec.

Through these hubs, the CDRIN will generate knowledge that will transform treatment interventions from coast to coast to coast. "With health care delivery under provincial jurisdiction, it is difficult to create national standards of care," says Dr. Merali. "Through the hubs, we are going to be able to implement changes nationally. Each hub in each region will start to use standard tools, methods and approaches."

The CDRIN spokes are starting to radiate locally, regionally, nationally, even internationally, thanks to a formal collaboration set up with the U.S.-based National Network of Depression Centers. As well, leading minds from across Canada, the U.S. and Europe congregated in Ottawa in late March for the CDRIN's inaugural conference, to share knowledge and exchange ideas.

"In bringing a unified approach, both in terms of the research questions that are asked but also in terms of implementing best clinical practices, the impact will be huge."

— Dr. Zul Merali

The Honourable Rona Ambrose, Minister of Health

The Government of Canada recognizes that mental health is critical to a person's overall health and well-being. We see leading-edge research as crucial to developing optimum treatments for mental illness, as evidenced by the approximately \$430 million the federal government has invested in mental health research through the Canadian Institutes of Health Research since 2006, and the \$5.2 million we recently committed to the Mental Health Commission of Canada, The Royal's Institute of Mental Health Research (IMHR) and the Mood Disorder Society of Canada for the creation of the Canadian Depression Research and Intervention Network (CDRIN).



Our Government is proud to support CDRIN, which draws on the strength of over 160 researchers and clinicians from across Canada who specialize in depression, as well as persons with lived experience. We applaud the network's important training and collaborative research approaches that will ultimately lead to more effective treatments for depression and post-traumatic stress disorder, and help prevent suicide.

I am pleased to have this chance to acknowledge the leadership of all involved in this endeavor, including the IMHR. In 2013-14, the IMHR played an instrumental role in establishing CDRIN's Central Canada depression research hub, and continues to support the development of CDRIN as a member of both the Central Canada hub and the CDRIN Board of Directors.

It takes many stakeholders working together to find answers to the complex issues related to mental health. I applaud the efforts of all who exemplify such cooperation by supporting CDRIN, and encourage the IMHR's work in this regard.

EXAMPLE: PROMOTING THE BEST TREATMENT METHODS

Through the CDRIN, the best treatment methods will be disseminated widely. A good example is the strategy that the IMHR uses, called augmentation therapy. By using multiple drugs instead of a single-drug approach, IMHR scientists have increased the remission rate in depression from about 30% to 50% after six weeks of treatment. Such a positive treatment approach would be disseminated through the hubs, into all communities.

Our Partners

At the IMHR we value our strong partnerships. Engaging our partners in leading-edge multidisciplinary research programs helps us foster innovative ways of diagnosing, treating and preventing mental illness.

CORPORATE PARTNERS:

IBM Canada Ltd.
Royal Ottawa Health Care Group (ROHCG)
Royal Ottawa Foundation for Mental Health (ROFMH)
University of Ottawa

NATIONAL PARTNERS:

Canadian Centre for Substance Abuse
Canadian Depression Research and Intervention Network
College of Family Physicians of Canada (CFPC)
Department of National Defence
Institute for Biodiagnosics (IBD)
Mental Health Commission of Canada (MHCC)
Mood Disorders Society of Canada (MDSC)
Veterans Affairs Canada
VHA Rehab Solutions/VHA Home Healthcare

NATIONAL UNIVERSITIES AND RESEARCH INSTITUTES:

Bishop's University
Brock University
Canadian Institute for Military and Veteran Health Research
Carleton University
Centre for Addiction and Mental Health
Children's Hospital of Eastern Ontario Research Institute
Dalhousie University
Fernand-Seguin Research Centre
Lawson Health Research Institute
London Health Sciences Centre
McGill University
McMaster University
Montreal Neurological Institute
Ontario Brain Institute
Ontario Centre of Excellence for Child and Youth Mental Health
Ottawa Hospital Research Institute
Queen's University
Saint Mary's University (Halifax)
Simon Fraser University
Sunnybrook Health Sciences Centre
University of British Columbia MRI Research Centre
Université du Québec en Outaouais
University of Alberta
University of British Columbia
University of Calgary
Université Laval
University of Manitoba
University of Montreal
University of Ottawa
University of Ottawa Brain and Mind Research Institute
University of Ottawa Heart Institute
University of Saskatchewan
University of Toronto
University of Western Ontario

INTERNATIONAL PARTNERS:

International Academic Centres

A partial list of international organizations with whom the IMHR has significant partnerships.

Australia: University of Sydney, University of Newcastle

Austria: University of Vienna, University of Salzburg

Brazil: Pontifical Catholic University, Ponto Alegre

China: Chinese Academy of Science, Fourth Military Medical University, Hangzhou Normal University, Huazhong University of Science and Technology, Peking University, Shaanxi Normal University, University of Hangzhou, Shanghai University, Taipei Medical University, University of Hong Kong, University of Science and Technology of China

Costa Rica: Universidad Nacional, Heredia

France: INSERM University Bordeaux, University Paris VI, University of Paris VII, University of Paris Ouest, Université René Descartes

Germany: Free University of Berlin/Charite, University of Bonn, University of Dusseldorf, University of Gottingen, University of Munich

Hungary: Hungarian Academy of Sciences, Semmelweis University

Italy: University of Bologna, University of Rome, University of Torino, University of Chiete

Iran: University of Tehran

Portugal: University of Porto

Spain: University of the Basque Country, Universidad de Castilla-La Mancha

Sweden: Karolinska Institutet

Switzerland: University Hospital of Psychiatry Zurich, University of Zurich

Taiwan: National University of Taiwan

United Kingdom: City University, London; University of Chester

United States: Columbia University, Johns Hopkins University, Medical College of Wisconsin, Medical University of South Carolina, National Institute of Mental Health (NIMH), University of Maryland, University of Miami, University of Michigan, University of South Carolina, University of Texas

International Research Centres & Networks

National Network of Depression Centers (NNDC)
University of Michigan Depression Center

Board of Directors



Roxanne L. Anderson (Chair)
Chief Restructuring Officer at Large



Watson Gale (Vice-Chair)
Vice-President, General Counsel and Corporate Secretary, Canadian Blood Services



Dr. Zul Merali (Secretary)
President and CEO, The Royal's Institute of Mental Health Research



Dr. Raj Bhatla
Psychiatrist-in-Chief and Chief of Staff, Royal Ottawa Health Care Group



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Vice President and Regional Publisher, Metroland Media



Rob Notman
CEO, KWA Partners (Ottawa); Chair, Board of Trustees, Royal Ottawa Health Care Group



Richard Patten
Former member of the Legislative Assembly of Ontario (Cabinet Minister of Government as well as Correctional Services) and Parliamentary Assistant to the Premier



Lynn Pratt
Partner, Deloitte & Touche LLP, Ottawa



Andrée Steel (Royal Ottawa Foundation for Mental Health Liaison)
President and CEO, Royal Ottawa Foundation for Mental Health



George Weber
President and CEO, Royal Ottawa Health Care Group



Shirley Westeinde (IMHR Board Liaison on ROHCG Board of Trustees for 2013-14)
Chair, Westeinde Group of Companies

Scientific Advisory Board

The Scientific Advisory Board provides expert advice and guidance on the research orientation, performance, and strategic directions of the Institute. Its members are leading figures in the national and international scientific communities, with outstanding clinical or basic science expertise in areas relevant to the IMHR.



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Interim Chair, Department of Psychiatry and Director, Neurochemical Research Unit, University of Alberta



Dr. Kimberly Matheson

Vice-President (Research and International), Carleton University



Dr. Mark Bisby

Past-President, Canadian Federation of Biological Societies and the Canadian Physiological Society; Past Vice-President (Research), Canadian Institutes of Health Research (CIHR)



Dr. Timothy Moran

Paul R. McHugh Professor of Motivated Behavior and Vice Chair in the Department of Psychiatry and Behavioral Sciences at the Johns Hopkins University School of Medicine



Dr. H. Christian Fibiger

Chief Scientific Officer, MedGenesis Therapeutix Inc.; Assistant Dean (Research) in the Faculty of Medicine at the University of British Columbia



Dr. Stanley Kutcher

Sun Life Financial Chair in Adolescent Mental Health, IWK Health Centre and Dalhousie University Director, World Health Organization Collaborative Centre in Mental Health Policy and Training, Dalhousie University



Dr. John F. Greden

Executive Director, University of Michigan Comprehensive Depression Center; Founder and Chair, US National Network of Depression Centers

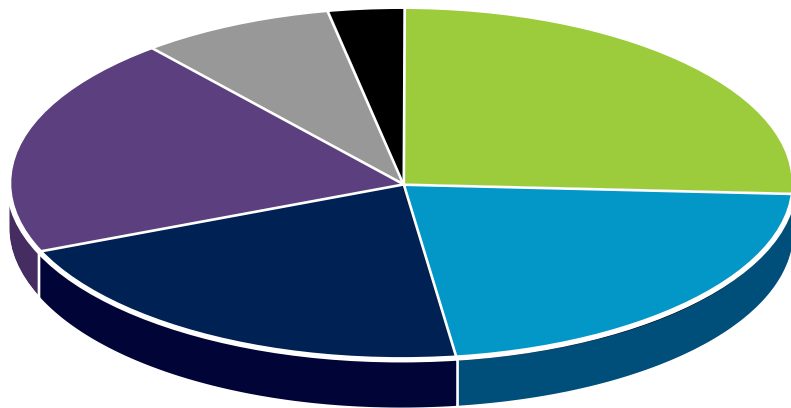


Dr. Franco Vaccarino

Principal of University of Toronto Scarborough; Vice-President, University of Toronto

By the Numbers

Revenue Distribution (\$10.4 million)



- 26% Grants/contracts/salary awards (direct)
- 23% Grants/contracts/salary awards (partnered)
- 21% Royal Ottawa Health Care Group
- 19% Royal Ottawa Foundation for Mental Health
- 8% University of Ottawa (partnered)
- 3% Investment Income

Sources of Revenue for 2013-2014

Allison Lees Memorial Legacy Fund

Barbara Crook & Dan Greenberg/Danbe Foundation

BMO Financial Group

Bristol-Myers Squibb

Britton Smith Foundation

Canada Research Chairs

Canadian College of Neuropsychopharmacology

Canadian Institutes of Health Research

E. Jennie James

EJLB Foundation

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Great-West Life Assurance Company

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Ministry for Science & Technology - Brazil

Ministry of Health

Mood Disorders Society of Canada

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Science Without Borders

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The Matthew Ginsburg Scholarship Fund

Trinity Development Foundation

Undergraduate Research Opportunity Program

University College London

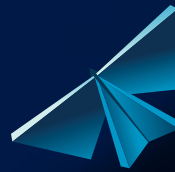
University Medical Research Fund

University of Ottawa

University of Ottawa Brain & Mind Research Institute

US Department of Justice

Women's Mental Health Centre



The :Le
Royal

Mental Health - Care & Research
Santé mentale - Soins et recherche

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