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# RESEARCH

## IMPACT REPORT

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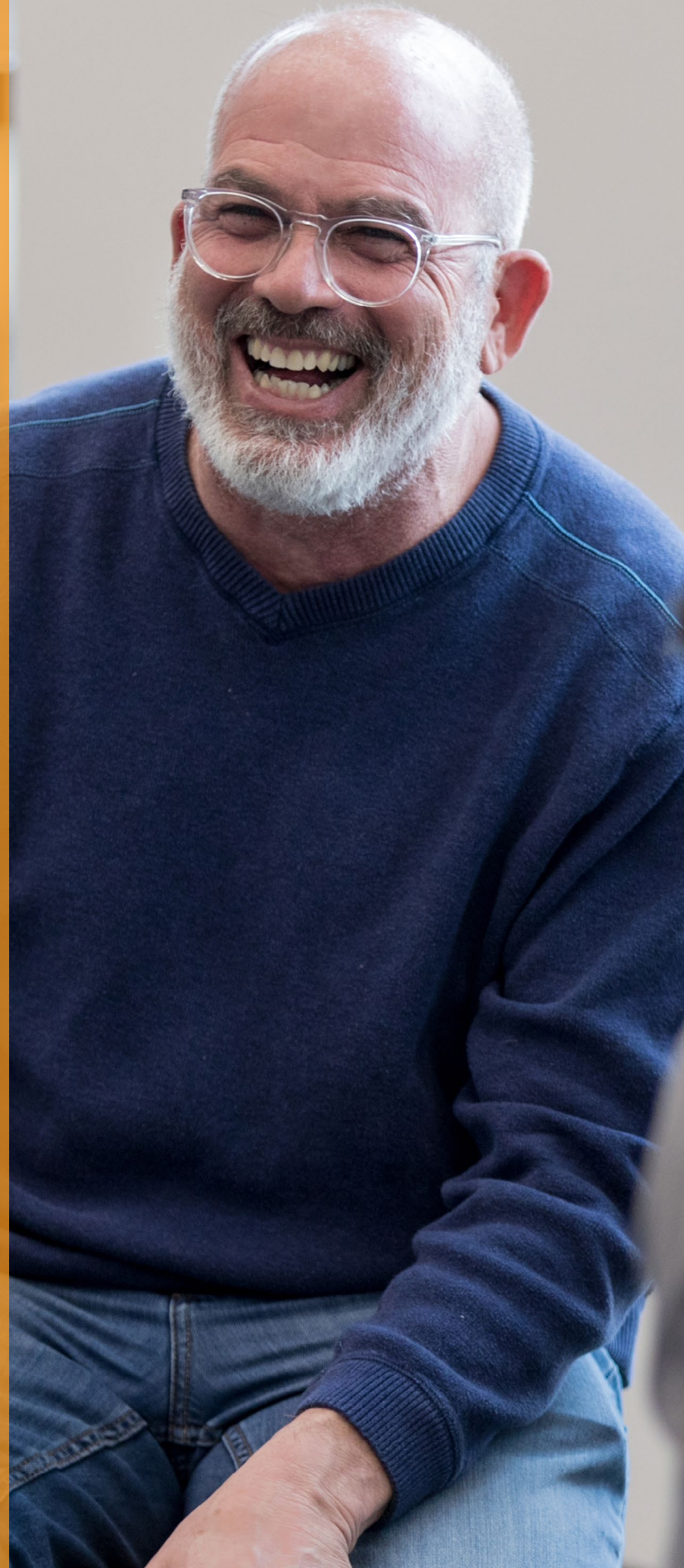


“It was like the volume of the world got turned down. It was indescribable going from anxiety level nine to all of the sudden the world isn't trying to hurt you anymore. It's unbelievable.

GRATEFUL RESEARCH  
PARTICIPANT

**ON THE COVER**

**STEVEN WEST** creates Brain BioArt imagery using photographic processing techniques combined with software programming of data from fMRI brain scans, developed at The Royal's Brain Imaging Centre.



# Together, we are rewriting the future.

The Royal is home to a diverse community of passionate and experienced researchers dedicating their lives to improving the future of mental health care. With more than 130 ongoing research studies using state-of-the-art facilities, we are igniting newfound optimism and hope.

From novel ideas to early-stage exploration and our most advanced research projects, one constant remains—the important role of philanthropy. Donors and supporters of The Royal are catalysts for bridging the gap between research and those who benefit the most—the patients and their families.

## In the following pages, we invite you to:

Embark on a retrospective journey through the Brain Imaging Centre.

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Hear from researchers, clinicians, and people with lived expertise who are driving progress and innovation in mental health research and care.

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Explore dynamic and innovative research unfolding at various stages.

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Learn about our plans to accelerate the impact of research.

**Thanks to your incredible generosity, mental health research at The Royal has advanced significantly in the past few years alone, impacting communities locally, provincially, across Canada, and worldwide. By believing in the power of this work, you are helping change the landscape of mental health, and for that, we are eternally grateful.**

# THE BRAIN IMAGING CENTRE

## Unraveling the mysteries of the brain

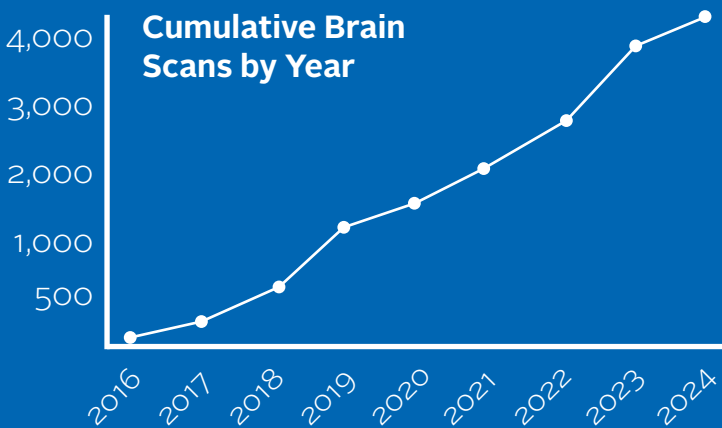
Thanks to a group of visionary donors and partners, The Royal purchased a combined PET/MRI machine in 2016. By combining two imaging techniques—positron emission tomography (PET) and magnetic resonance imaging (MRI)—researchers can view both the structure and activity of the brain.

There are only five PET/MRI scanners in Canada, and The Royal's is the only one dedicated to mental and brain health research and care in the country. As we continue to expand and evolve the Brain Imaging Centre, and harness the full potential of this cutting-edge imaging technology, **we remain driven by curiosity and commitment to improve how the mental health community can diagnose, treat, and prevent mental illness and substance use disorders.**

### The Brain Imaging Centre in numbers:



**4,000+ SCANS**  
SINCE OPENING



**SUICIDE PREVENTION**

**Researchers at The Royal identified a novel biological indicator of suicidal ideation using brain imaging.** The study links increased brain inflammation and changes in the brain's communication pathways to suicide attempts, suggesting a biological vulnerability to suicide. The team has published their findings and is now exploring additional biological indicators of suicide by examining blood samples.



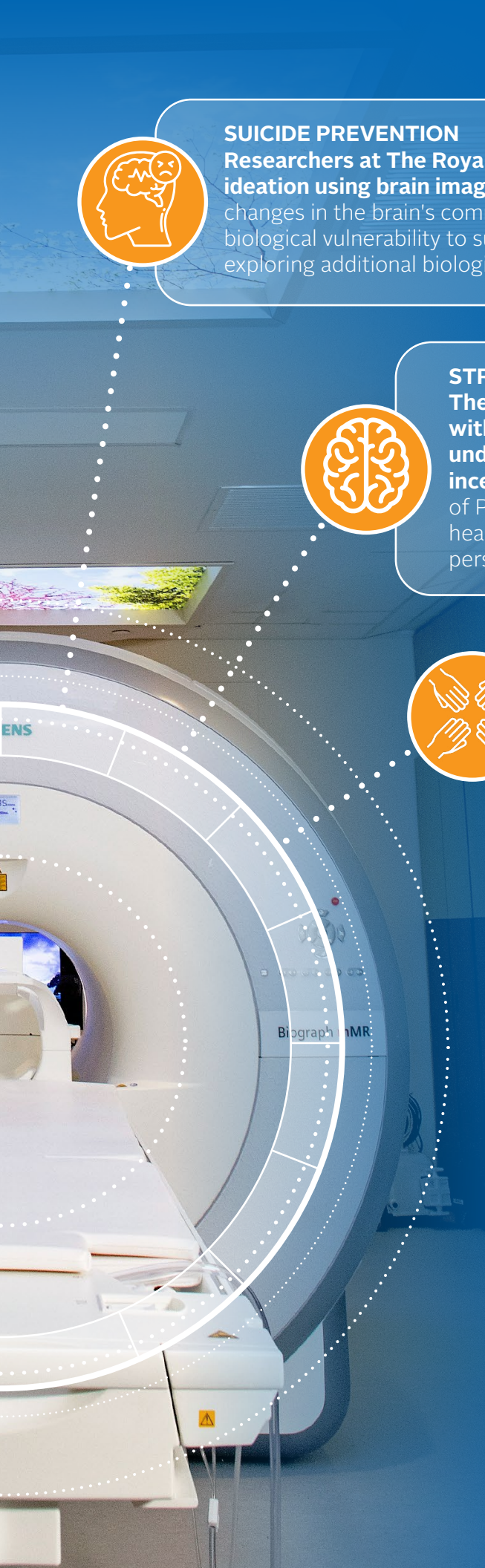
**STRESS AND TRAUMA (PTSD)**

**The Brain Imaging Centre was founded in collaboration with the Department of National Defence and has operated under a strategy informed by military mental health since its inception.** One ongoing study, Multi Dimensional Assessment of PTSD Subtypes (MAPS), explores factors like brain function, heart rate, sleep patterns, genetics, and inflammation in military personnel and veterans.



**IMPROVING DEMENTIA DIAGNOSIS**

The Royal is increasing access to MRI and PET medical imaging for patients who have inconclusive clinical symptoms of dementia. By taking a patient-centered approach, a clinical team is **looking to better tailor treatments for specific types of dementia.**



"The Brain Imaging Centre has been a major draw for researchers, students, and partners looking to advance their research in mental health. Having this cutting-edge technology at The Royal has led to incredible innovation and discovery—from major depression to suicide prevention, schizophrenia, PTSD, sleep disorders, and beyond. Seeing the impact it has had on discovery in mental health is incredible. It motivates our team to continue to grow both the capabilities of our infrastructure, and the expertise to support it.

**KATIE DINELLE**

*Administrative Director,  
Clinical Brain Research Centre,  
The Royal*

# RESEARCH WITH IMPACT

## Bridging the gap between research and care

One of the powers of conducting research in a hospital setting is that we are able to provide hope to those for whom other avenues of treatment have been unsuccessful. Receiving care through participation in our clinical trials and other research studies allows patients to reclaim a sense of control over their health and future.

To pave the way for personalized treatments, improved diagnostics, and prevention in mental health, The Royal brings together the pillars of research, care, and lived expertise. **The guiding principle *Research is Care* is at the heart of our mission, influencing every aspect of our work.**

## Research continues where care begins

At The Royal, research extends seamlessly into care, allowing us to deliver evidence-based support, informed by the latest data. This approach has many benefits, including increased accessibility, improved patient outcomes, and the ongoing refinement of treatment efficacy and applicability within clinical settings.

To demonstrate the philosophy of *Research is Care* and to showcase how The Royal is closing the mental health recovery gap, **we proudly highlight two of our most advanced research projects, both of which have been significantly enhanced by philanthropy.**

- 1 **Esketamine Treatment**
- 2 **Repetitive Transcranial Magnetic Stimulation (rTMS)**

## 1 **ESKETAMINE TREATMENT**

Under medical supervision, esketamine nasal spray, derived from the long-standing anesthetic ketamine, significantly reduces depressive symptoms. Researchers at The Royal were the first in Canada to deliver this novel treatment in 2010. They have long advocated and participated in its continued discovery and research.

**With philanthropic support, The Royal opened the BMO Innovative Clinic for Depression in 2023 to treat more patients with major depression using esketamine.**

## 2 **REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION (RTMS)**

**rTMS has rapidly become a sought-after treatment for depression, owing success to its efficacy and minimal side effects.** This non-invasive procedure uses an electromagnetic coil to deliver repeated magnetic pulses, stimulating nerve cells in the brain. The Royal is home to Ottawa's first rTMS clinic, and in 2023, thanks to philanthropy, the clinic tripled its capacity. To better understand how rTMS interacts with the brain, and to personalize delivery of the treatment, the research team is harnessing neuroimaging technology at the Brain Imaging Centre.



## Collaborative, patient-centred research

**Connecting research and care is about bringing together varied knowledge and experiences to create greater understanding and impact.** We believe patients and their loved ones should be active participants in their own care, and that extends to the design and implementation of our research programs.

Client Advisory Council and Family Advisory Council members actively contribute to research through various avenues, including involvement in research ethics boards, educational research projects, research committees, board memberships, working groups, participation in clinical trials, and so much more.



"I have been very impressed and very honoured with the level of inclusion I have experienced as a family advisor in a research working group. Every question I have asked, and every suggestion I have offered has been welcomed into the discussion. **I feel my voice is listened to, heard and represented in the work that we are doing.**"

### CHRISTINE TAYLOR

*Member, Family Advisory Council*



"You don't always know that what you are bringing is valuable, but every little thing we can offer, every curl of wisdom that comes from lived expertise, has the potential to improve research outcomes. **Research at The Royal has embraced the client and family voice and has decided its importance.**"

### GLEND A O'HARA

*Chair, Client Advisory Council  
President, Royal Ottawa Volunteer Association*



## RESEARCH SPOTLIGHT

Your support fuels the exploration of an exciting and diverse range of questions that interdisciplinary teams at The Royal are hard at work addressing.



### VIRTUAL REALITY (VR) & COGNITION

By using a special headset that allows an individual to explore a virtual world, Dr. Synthia Guimond's team is **looking to improve executive function, social cognition, attention, and memory for people with psychotic disorders**, including schizophrenia. In the study, participants are taught strategies to boost their memory and are transported to a virtual restaurant environment. Here, they take on the role of a server and practice their recall by taking customer food and drink orders and relaying orders to the kitchen.

*"In schizophrenia in particular, the majority of people struggle with their attention or memory troubles, which can negatively impact their ability to function in society,"* says Dr. Synthia Guimond, a scientist at The Royal.

### BURNOUT & HEALTHCARE WORKERS

A new study **seeks answers to the psychological and biological impact of burnout on healthcare workers** by combining clinical and biological data and neuroimaging at The Royal's Brain Imaging Centre. The multidisciplinary team is also examining links between burnout, stress, mental health service use, moral distress, and factors associated with resilience and coping.

It's a timely topic, says Dr. Jennifer Phillips, the study's principal investigator and interim scientific director of the Institute of Mental Health Research at The Royal.

*"We know that the rates of burnout are high in healthcare workers. Among nurses, physicians and medical trainees, for example, the rates of burnout have increased – now they're higher than they were before the pandemic started."*



### HARNESSING DATA TO PREDICT SUICIDE RISK

Researchers at **The Royal used advanced data analytics and machine learning to predict the progression from suicidal ideation to suicide attempts** through the electronic health records of patients at The Royal. These findings were leveraged to secure funding to replicate the model across the province of Ontario.

With access to data from over 130,000 individuals with psychiatric admissions since 2018, the team will further develop machine learning models to identify patients at elevated risk of suicide.







## MUSIC & MENTAL HEALTH

Music—whether listened to, learned, or performed—significantly influences emotions, mood, sensory, and cognitive functions, enhancing overall well-being; while the impact on mood is well known, there is still much to explore about its therapeutic potential.

Dr. Gilles Comeau is an expert in music pedagogy who collaborates with experts across a variety of disciplines and people with lived expertise. The Music and Mental Health Research Clinic at The Royal **explores the interconnections between music and mental health, with the aim of establishing evidence-based, personalized treatment options for using music as therapy.** Comeau is particularly interested in exploring how music can benefit older adults and combat age-related health conditions.

## DELVING FURTHER INTO BIPOLAR DISORDER RESEARCH

In a joint partnership between The Royal and The Ottawa Hospital, Dr. Gayatri Saraf took on the position of junior research chair, a prestigious role awarded to early-career researchers who have demonstrated significant promise in their area of study.



Saraf, who has previously studied brain inflammation in bipolar disorder, is excited about tapping into the resources of The Royal's Brain Imaging Centre. Bipolar disorder, previously known as manic-depressive illness, is a mental health condition characterized by severe mood swings that cycle between periods of intense "highs" (mania or hypomania) and periods of intense "downs" (depression). For Saraf, the position of research chair is a meaningful boost at the right time, as there is much more research to be done.

“It's an exciting time to be a researcher in mental health.”

DR. GAYATRI SARAF

## THE CLINICAL BRAIN RESEARCH CENTRE

Entering a bold new era,  
thanks to you.



"We are incredibly proud of how The Royal has transformed over the last few years and the high-calibre team of scientists, clinicians, trainees, and staff that are providing access to care through research.

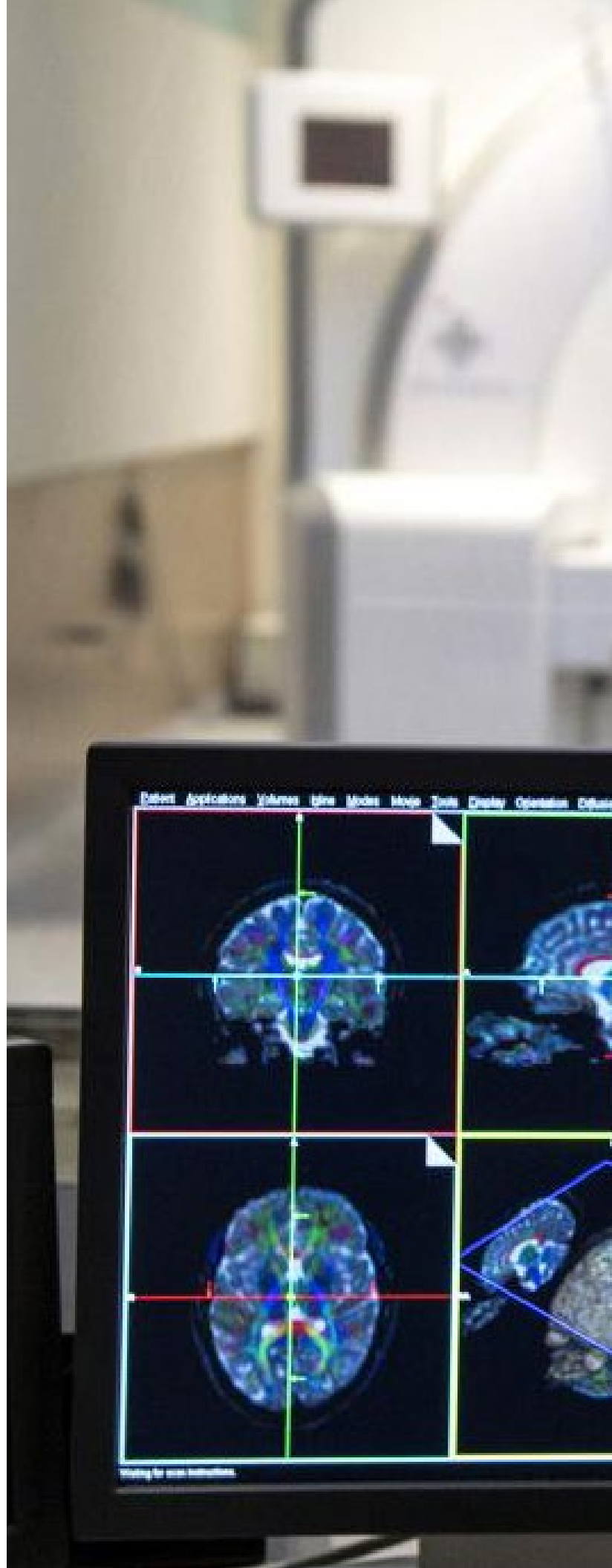
As we look ahead, we are refining our vision for the future of research at The Royal. We are ensuring we can offer our patients the best chance of recovery, while also leading and contributing to a global shift in mental health care. The **Clinical Brain Research Centre**, anchored by the success of the Brain Imaging Centre, promises to do just that, bringing research and innovation to the point of care, for better, and more accessible, prevention, diagnostics and treatment options.

**Much of this is made possible by our generous donors, without whom this work would be out of reach. Your remarkable generosity not only enhances but also intensifies the urgency of our mission to bring meaningful impact to our patients."**



**DR. FLORENCE  
DZIERSZINSKI**

President of the Institute of Mental Health Research,  
Vice-President of Research,  
The Royal





## Thank you

Understanding the intricacies of how the brain functions and what differs for people with mental illness remains one of the greatest challenges in modern science. Rather than hinder us, this challenge serves to inspire us.

The invaluable support of donors like you brings hope to individuals grappling with mental and substance use health needs. Through the convergence of research, innovation, and breakthroughs in care, we are collectively forging a future that is both brighter and more empathetic.

**It is through your kindness and generosity that The Royal is able to continue its work and make a real difference in the lives of so many. We can't thank you enough for igniting and advancing our evolution, for caring so deeply, and for being there every step of the way.**



**CHRIS IDE**

President,  
Royal Ottawa Foundation  
for Mental Health



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