

CAMH Research
Impact Report 2019

Inspiring Hope through Discovery



CAMH Research Impact Report

Five high-impact research areas that reflect our long-term vision to revolutionize the global understanding and treatment of mental illness and improve mental health

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Bill Hogarth, Chair of the Research Committee of the CAMH Board of Trustees (left), Dr. Bruce G. Pollock, Vice President, CAMH Research.

Inspiring Hope through Discovery

Hope is a sentiment often expressed in connection with CAMH. In research, hope reflects the future promise of the knowledge we generate today, and it is the overarching message of our new research plan. Launched in 2018, the Research Plan 2018–2023 sets out three broad directions for CAMH research, which were established following consultations with more than 200 stakeholders.

Hope is built upon an engine of discovery driven by CAMH's scientists, staff and trainees, and fuelled with the support of the hospital and the Research Committee. The dedication and innovation are evident in the pages of this Research Impact Report. The report outlines the growth and impact of five areas of research—selected from among many others—and points to our potential. This potential will be significantly augmented with the remarkable anonymous donation that established the CAMH Discovery Fund last year.

Today, CAMH remains the number one mental health research hospital in the country based on Research Infosource rankings. CAMH is also one of Canada's top-ranked research-intensive hospitals overall, as research accounts for a significant part of the work at the hospital. CAMH leadership and the Research Committee have worked together to expand the recognition of this success and the impact of research, throughout the hospital, across Canada and internationally.

This work will become more crucial as we direct our efforts to plan for a new research building. From three different sites today, we aim to consolidate into one dynamic new building, on a single campus with the rest of the hospital.

Achieving this goal will be a major focus of our commitment in the coming years.

The role of brain inflammation

Depression discoveries show potential for other brain illnesses

In the quest to better understand the biology of brain-based illnesses, scientists at CAMH and around the globe are actively investigating the role of inflammation in the brain.

Brain imaging is an important approach in this pursuit. As one of the world's leading brain imaging centres, CAMH has a successful track record in developing sophisticated chemical probes, known as radiotracers, that attach to specific brain targets and "light up" in scans to signal brain activity. Radiotracers can be used to yield insights to establish a biological diagnosis or to develop more targeted treatments.

A timeline of CAMH impacts in brain inflammation research



A new brain imaging centre

In 1991, CAMH opens one of the first brain imaging centres in Canada dedicated to research into mental illness, using positron emission tomography (PET).

The Research Imaging Centre expands in 2012 to include a magnetic resonance imaging (MRI) suite, and again in 2017, when the Azrieli Centre for Neuro-Radiochemistry is established.

A tool to "see" brain inflammation

A radiotracer, or chemical probe, to study brain inflammation is developed in 2008. This radiotracer attaches to the translocator protein (TSPO), one of the proteins activated by glial cells as part of the inflammatory process. The radiotracer is first tested in humans in 2012.

Proof of inflammation in depression

A 2015 CAMH study in *JAMA Psychiatry* shows the first evidence that brain inflammation occurs in depression. The results are confirmed six times, by four independent groups. Another CAMH study in *The Lancet Psychiatry* shows that people who have untreated depression for more than 10 years have higher brain inflammation than those who have been treated.

Dr. Neil Vasdev is director of the new Azrieli Centre for Neuro-Radiochemistry.

Connecting brain inflammation to brain-based illness

What is brain inflammation and why might it be harmful?

When our bodies are injured or infected, our immune system kicks in, which triggers a complex inflammatory response in our cells to repair damage or fight infection. Yet when the inflammation is chronic, it can be harmful. Research helps determine whether inflammation is damaging and needs to be treated, or whether it is protective, which may be the case among people with certain types of addiction, explains Dr. Stephen Kish.

Using a CAMH-developed probe, Dr. Jeffrey Meyer has had impact in achieving both of these goals. He has shown the first evidence of inflammation in the brains of people with clinical depression, using positron emission tomography (PET) imaging. A blood test is now in development that would indicate which patients have brain inflammation. And clinical trials are underway to test whether anti-inflammatory medications such as minocycline and celecoxib can reduce depressive symptoms.

These advances in depression research also point to the potential for new insights into other illnesses. A new generation of radiotracers is being investigated at

CAMH to study harmful inflammation in other brain-based conditions, such as dementia, Parkinson's disease and brain injury, says Dr. Neil Vasdev. Inflammation activates different brain cells such as microglia, which in turn sets off a series of reactions involving various enzymes and proteins, some of which are promising new targets. "Continuing the development of these radiotracers can enable early diagnosis, allow us to track the progress of disease, and help us to understand patient responses to treatment," says Dr. Vasdev.

From brain scans to clinical impact

Today, new studies that involve repurposing anti-inflammatory medications are underway to see whether they are effective in alleviating depressive symptoms.

A patent application has been filed for a blood test to identify signs of brain inflammation linked to depression. It may help determine who will benefit from anti-inflammatory medications.



Dr. Isabelle Boileau (centre) is using a new radiotracer to study brain inflammation in the military and young athletes, in research funded by the Canadian Institute for Military and Veteran Health Research.

The future: Alzheimer's, Parkinson's disease and more

New radiotracers are being developed for use with Alzheimer's disease, traumatic brain injury and Parkinson's disease. These radiotracers target different aspects of the inflammatory cascade that are linked to illnesses. Promising examples of targets include the enzymes MAO-B and GSK-3.

Teasing out the role of inflammation

A growing body of research over the past two decades has pointed to a link between brain inflammation and brain-based illnesses. As one example, people taking vaccines or cancer medicine that trigger an inflammatory immune response were seen to develop depression. In Alzheimer's disease, brain inflammation was first observed in post-mortem brain tissue and recently was confirmed using brain imaging. The ability to use imaging to study brain inflammation in living patients is a major advance.

Child and youth mental health

Putting young people at the centre of transformations in care

Like a kid growing up, the field of child and youth mental health is changing substantially, and CAMH research is contributing on many fronts.

Compared with 15 years ago, there is now widespread public understanding that young people can experience depression and other mental illnesses, and that addressing mental health early is key, says Dr. Peter Szatmari. It has been shown that half of all cases of mental illness begin by age 14. Intervening in childhood and adolescence may prevent mental illness or lessen its impacts over a person's lifetime.

A timeline of CAMH impacts in child and youth mental health research

Student survey launches

CAMH researchers launch the Ontario Student Drug Use and Health Survey (OSDUHS) in 1977, focusing initially on substance use and adding the first mental health indicators in the 1990s. Results inform provincial policies, such as the School Mental Health Strategy and public health campaigns. OSDUHS is now the longest-running student survey in Canada.



At a new type of youth mental health clinic, opened in 2016 as part of a CAMH-led study.

Tackling LGBTQ2S youth homelessness

CAMH research highlights challenges faced by LGBTQ2S youth, who make up a large proportion of homeless youth. To address the issue, the Alberta government approves all six key recommendations in a provincial strategy report in 2015. Alberta is the first province to make such a major commitment, including funding for specialized housing and provincial staff training.

Evaluating youth mental health courts

In 2016, five years after Ontario's first youth mental health court opens, CAMH research shows the model is succeeding in supporting young people with mental illnesses, who are over-represented in the criminal justice system. The courts are improving access to treatment, leading to greater and more timely engagement in mental health services, and ultimately positive legal outcomes for these youth.

A growing provincial, federal and global focus

High provincial priorities

Open Minds, Healthy Minds: Ontario's Comprehensive Mental Health and Addictions Strategy comes out in 2011. The new strategy sets child and youth mental health priorities as its focus for the first three years.

Even before the importance of child and youth mental health was widely recognized, CAMH was leading research to improve mental health among young people. This work has informed government policies and services, helped pinpoint the biological underpinnings of illnesses, advanced evidence-based treatments and created new types of services.

CAMH scientists, young people and their families are partnering in research and co-designing solutions. These collaborations are having on-the-ground impacts: new youth mental health clinics are opening, offering psychotherapy, employment, education and housing services. As next steps in tailoring interventions to young people, CAMH researchers are conducting studies on

matching effective treatments to children with disruptive behaviour, and identifying how autism spectrum disorder differs between girls and boys.

Neuroscientists specializing in children are using increasingly sophisticated, data-driven approaches to integrate analysis of different data types, and are targeting the brain with promising innovative treatments, such as combining brain stimulation therapy and brain training exercises for youth with hard-to-treat depression.

“The transformation in care is happening,” says Dr. Joanna Henderson. “It’s in its early stages, and there’s a long way to go to make sure changes are sustained over time—which is why research and evaluation are so critical.”

Brain changes across disorders

An innovative study published in 2016 in the *American Journal of Psychiatry* shows common brain changes in children with autism spectrum disorder, attention deficit/hyperactivity disorder and obsessive compulsive disorder. The findings show the value of examining multiple disorders at the same time to uncover shared biological factors that may explain overlapping symptoms across these disorders.

Evidence-based depression treatment

The best clinical practice guidelines for youth with depression are identified by CAMH’s Cundill Centre for Child and Youth Depression, in a field that has lacked a consistent, evidence-based approach. The team goes on to develop a treatment decision aid for health care professionals in 2017.

A new kind of youth mental health clinic

In 2018, the Ontario government launches Youth Wellness Hubs Ontario, building on the success of three new one-stop-shop youth mental health clinics that opened in 2016. The three earlier sites launched as part of a study led by CAMH’s Margaret and Wallace McCain Centre for Child, Youth & Family Mental Health. Ten sites will offer this innovative model of care.

The future: Technology advances, tailored care

CAMH research is using mobile and wearable technology to study youth depression, and is developing and evaluating an app to improve care. To identify the key components to ensure that youth mental health services are effective, a new study will engage 1,500 young people, family members and service providers throughout Ontario.

A substantial federal–private research initiative

In 2012, the federal Minister of Health, the Canadian Institutes of Health Research and the Graham Boeckh Foundation announce a \$25-million joint investment to launch a research network focused on improving youth mental health care and outcomes. The initiative signals a strong commitment to change.

Sharing knowledge worldwide

Frayme begins as a Canada-led, international knowledge-sharing network to improve youth mental health and substance use services. The network of health care professionals, youth, family members, policy makers and researchers aims to share evidence and identify gaps where research is needed to transform care.

Brain stimulation for treatment and discovery

Advancing an innovative technology

When a person has to endure symptoms of mental illness because current treatments don't work for them, the need for alternatives is obvious.

CAMH has been a pioneer in the use of brain stimulation, one of the few new treatment options for mental illness in the past 30 years. CAMH's Temerty Centre for Therapeutic Brain Intervention is leading innovative studies that suggest this therapeutic approach, which targets the brain's neural circuits, holds promise for many mental illnesses.

For hard-to-treat depression, repetitive transcranial magnetic stimulation (rTMS) is known to be effective, but the course of treatment, at 45 minutes daily for up to

A timeline of CAMH impacts in brain stimulation research

Brain stimulation is established

The first transcranial magnetic stimulation (TMS) device is set up at CAMH in 1998 to study brain physiology. By 2002, its use is approved in treatment protocols at CAMH. The first studies in schizophrenia and depression begin within the next two years.

New forms of stimulation

The use of transcranial direct current stimulation (tDCS) in depression begins in 2009, which lays the groundwork for PACT-MD, a large-scale study aimed at preventing Alzheimer's dementia.

Expanding across CAMH

The formation of the Temerty Centre for Therapeutic Brain Intervention in 2012 leads to an expansion of brain stimulation research, establishing the Centre as a hub of expertise and collaborative research for scientists across CAMH.

Suicide therapy, ECT alternative

A 2016 CAMH study in *JAMA Psychiatry* shows that brain cell activity can be measured to predict whether magnetic seizure therapy (MST) reduces suicidal thinking in people with severe depression.

A major multi-site study compares electroconvulsive therapy (ECT) with MST, which may be a more acceptable treatment to patients than ECT.

Clinical and regulatory changes for a new treatment technology

The first device

A prototype transcranial magnetic stimulation device is built in 1985 in the United Kingdom to study brain physiology. By the mid-1990s, studies begin on depression treatment.

six weeks, is time-consuming and cost-intensive. In a major advance, a study led by Dr. Daniel Blumberger has shown that a new “theta-burst” form of rTMS that takes only three minutes is just as effective as the standard.

Different forms of brain stimulation, including rTMS, transcranial direct current stimulation (tDCS) and magnetic seizure therapy (MST), are being studied as both treatment and investigative tools. “We’re aiming to identify and study biological targets for treatment, and to understand the brain mechanisms underlying disorders,” says Dr. Jeff Daskalakis.

While brain stimulation is not yet a household term, the range of promising studies underway at CAMH suggests it will be in the future. Researchers are exploring the use of brain stimulation to improve memory in schizophrenia, reduce cravings in cannabis addiction, prevent Alzheimer’s dementia, treat post-traumatic stress disorder and mild autism, and more.

Effectiveness at three minutes

A 2018 CAMH study in *The Lancet* shows that half of all patients respond to three-minute theta-burst repetitive transcranial magnetic stimulation (rTMS) and that one-third achieve remission from depression. These patients, whose depressive episodes averaged over two years, had at least one unsuccessful treatment with antidepressant therapy or psychotherapy in the past.



Demonstrating an innovative, CAMH-developed approach to study brain plasticity—the brain’s ability to adapt or change.

Future directions: PTSD, schizophrenia, autism and more

Different types of brain stimulation are investigated to treat a range of symptoms and to identify brain mechanisms in depression, autism, PTSD, schizophrenia and addiction.

Health Canada approval

In 2002, Health Canada approves repetitive transcranial magnetic stimulation (rTMS) to treat depression that hasn’t responded to other treatments. The U.S. Food and Drug Administration follows suit in 2008.

Increasing accessibility

In 2016, Health Quality Ontario recommends that rTMS be funded for patients with treatment-resistant depression when ECT, which is more effective, is not an option. Saskatchewan and Quebec are the only provinces that currently cover rTMS treatment costs.

A paradigm shift in Indigenous research

Building mental wellness through community-driven approaches

Research in First Nations, Inuit and Métis communities in Canada is evolving rapidly, as Indigenous communities are mobilizing to develop culturally appropriate research approaches. Amid this changing landscape, CAMH researchers and Indigenous communities are creating research models that are having visible impacts on mental wellness within communities.

At the core of these models is collaboration in its fullest sense, involving meaningful, respectful engagement with the community at every step, says Dr. Samantha Wells. She and Dr. Julie George, of Kettle and Stony Point First Nation, are leading an initiative that is building relationships and co-developing research and wellness strategies in five First Nations. CAMH's Aboriginal Engagement and

A timeline of collaborative impacts on mental wellness in Indigenous communities

The beginnings of a new research model

A CAMH mobile lab study that begins in 2011 leads to community-driven collaborations between CAMH researchers and Kettle and Stony Point First Nation, and Aamjiwnaang First Nation. The project identifies community needs related to mental health, substance use and violence. The findings are later used to develop wellness strategies in both communities.



The sweat lodge in the sacred healing space at Kettle and Stony Point Health Services, built by the men who participated in research.

Bolstering community services

Based on the mobile lab study, boys' and men's mental health is identified as the priority in Kettle and Stony Point. A participatory action research project leads to new mental health and substance use services, and the creation of an outdoor sacred healing space, with a sweat lodge, tipi and food and medicine garden—all led by the men who took part in the research.

Signaling shifts toward highly collaborative research

First Nations–developed research principles

In 1998, new First Nations–developed research principles outline a shift in how this research should be conducted. The First Nations Information Governance Centre's principles of ownership, control, access and possession (OCAP) state that First Nations communities control information collected in their communities. The principles underscore that research must be conducted not only in Indigenous communities, but with Indigenous communities.

Outreach team, led by Dr. Renee Linklater, plays a pivotal role in establishing strong relationships with these communities, and in providing guidance, by Indigenous research ethics expert Julie Bull, for ethically sound data-sharing between CAMH and participating communities.

Ensuring that research has direct benefits for communities is critical. Important impacts are already evident. These include the creation of new mental health and substance use services and a sacred healing space in Kettle and Stony Point, guided by the men of the First Nation who took part in the research. In the North, Dr. Allison Crawford's work with the Arctic Council and the Inuit Circumpolar Council is engaging Inuit and Sámi youth and communities in suicide prevention.

Working from a strengths-based perspective, all this research uses innovative, highly participatory approaches. Digital storytelling supports the sharing of experience among Elders and Inuit community members. With Photovoice, community participants take photos as a way to unearth experiences, needs and strengths to achieve wellness.

These projects are building research capacity within Indigenous communities, paving a path for future research that is both community-driven and initiated from the ground up within the community.

Informing suicide prevention in the North

Following the launch of the National Inuit Suicide Prevention Strategy in 2016, the Arctic Council's RISING SUN project, including a CAMH scientific advisor, determines priorities for suicide prevention across the Arctic, resulting in a 2017 implementation report and evaluation toolkit.

A youth-engaged initiative

Building on the Arctic strategy, a new research project is engaging Indigenous youth across the circumpolar north, using digital storytelling to surface ideas for building strengths and resilience. The research will inform suicide prevention strategies. Youth from Canada, Alaska, Finland and Greenland are involved.

Spreading the co-creation model

Expanding on the model developed from earlier projects, an initiative launched in 2018 will identify community needs and strengths related to mental health in five First Nations. Participatory action research will be used to develop wellness strategies within communities, such as addressing anxiety and depression among youth in Aamjiwnaang First Nation. The project will also develop recommendations for strengths-based services.

The future: New collaborations

Community-driven models are advancing knowledge and enhancing wellness in new areas: understanding mental health and wellness among the Innu in two communities in Labrador; reducing high rates of commercial tobacco smoking among Indigenous peoples in 13 communities across Ontario; and understanding the impacts of cannabis legalization in Indigenous communities across Canada.

Changes in federal research policy

In 2010, the federal policy governing research also ushers in changes in how research involving First Nations, Inuit and Métis peoples takes place across Canada. A key requirement is that researchers must engage with and obtain approval from Indigenous communities to conduct research before any research begins.

Growing community mobilization

In the last 10 years, Indigenous communities are increasingly creating approaches to conducting research within their communities, developing research processes and rigorous structures to review and approve proposals. All of these changes are promoting highly collaborative research models.

Gene-guided treatment

A tipping point for personalized medicine

The mass marketing of genetic testing kits, such as Helix and 23andMe, suggests that our DNA can provide simple answers about our health. In reality, applying genetic knowledge to improve a patient's health is much more complex.

For more than 20 years, CAMH has been at the forefront of bringing genetic testing from lab to clinic, to identify which medications are most likely to work for a given patient without side-effects. Physicians can use the results to select medications or adjust doses. Patients are spared trying one medication after another. "We have shown that we can create a practical, affordable and simple report that works," says Dr. Daniel Mueller.

A timeline of CAMH impacts on genetic testing for medication response

The role of genes in smoking

A 1998 CAMH study in *Nature* shows that smokers with a certain genetic marker (CYP2A6) are less likely to develop a nicotine addiction and will smoke fewer cigarettes. Ongoing research shows that the same genetic marker can be used to predict the best treatment for nicotine addiction.

The first Canadian clinic

CAMH opens Canada's first pharmacogenetics research clinic for mental illness in 2008. The clinic is dedicated to understanding how patients' genes influence their bodies' response to medications for depression, anxiety, schizophrenia and other illnesses.

Tackling serious side-effects

A series of studies from 2010 to 2015 identifies six genes that predict who is at higher risk of one of the most serious side-effects of antipsychotic medications—weight gain.

Based on these findings, an innovative treatment algorithm is developed and is being tested at CAMH and through an international consortium.

Into the community

Through the Tanenbaum Centre for Pharmacogenetics, CAMH begins the large-scale IMPACT study in 2012 to assess genetic testing in everyday clinical care, through family physicians and psychiatrists across Ontario and beyond.

After decades of research, the uptake of genetic testing accelerates

Toronto origins of pharmacogenetics

The University of Toronto's Werner Kalow, a pioneer in the field of pharmacogenetics, shows in 1957 that genes are causing an anesthetic drug to be fatal for some patients. Five years later, he publishes the field's first textbook, "Pharmacogenetics: Heredity and the Response to Drugs."

Regulatory approval

In 2005, the U.S. Food and Drug Administration (FDA) clears the use of testing with two genetic markers (CYP2D6 and CYP2C19), but this is not widely translated into clinical care.

Through the IMPACT study, led by Dr. James Kennedy, thousands of patients across Ontario have had genetic testing. The GeneSight test panel analyzes eight genes to provide information on 33 psychiatric drugs. It was developed by Assurex Health, which has a partnership with CAMH. For depression and anxiety, the test has been shown to reduce the severity of patients' symptoms.

While the field seems to be approaching a tipping point—with pharmacies now selling genetic tests directly to customers—researchers caution that there is still a lot to learn.

At CAMH, powerful computing techniques such as machine learning are being used to validate and identify new genetic markers. There is potential to develop multi-gene risk scores to predict medication responses based on hundreds or even thousands of genes, which Dr. Mueller's team is also applying to unravel the genetic underpinnings of aging and depression onset. Dr. Rachel Tyndale is expanding her research on gene-guided treatment for nicotine addiction into diverse populations that may metabolize drugs differently, such as Indigenous peoples and pregnant women. And the IMPACT study continues to build evidence to show that genetic testing is effective for patients, and more efficient and less costly for the health care system.

Evidence for nicotine addiction

A 2015 *Lancet* study shows that gene testing is effective in guiding treatment for nicotine addiction. The genetic marker CYP2A6 can be used to indicate whether a nicotine patch or the medication varenicline should be used.



Dr. Gwyneth Zai studies genetic markers for obsessive-compulsive disorder and anxiety to inform diagnosis and treatment.

Individual to international impact

More than 11,200 people, referred by more than 3,000 physicians, have had genetic testing through CAMH to guide medication prescribing.

In a 2018 study, use of the GeneSight test panel improves symptoms of depression, and 15 per cent of patients go into remission.

Centres from around the world seek CAMH's guidance on implementing genetic testing in clinical care.

The future: The power of big data

Applying advanced computing techniques, such as machine learning, holds the potential to accelerate discovery.

The development of polygenic risk scores, with results based on thousands of genes, may improve predictions. A risk score to optimize smoking treatment is the first to be developed.

Guidance for clinicians

The Clinical Pharmacogenetics Implementation Consortium (CPIC) is formed in 2009 to provide actionable guidance on prescribing based on genetic testing.

Commercial testing

Canadian pharmacies now sell genetic tests directly to customers, without physician referrals.

The FDA authorizes the first direct-to-consumer commercial test by 23andMe in 2018—but states that results must not be used to make any medical decisions, and must first be confirmed through independent genetic testing.

The numbers behind our impact

Scientists at CAMH



Fiscal year 2017-18

Research rankings



Rank among mental health research hospitals in Canada

1

Rank among Canada's top 40 research hospitals (Research spending)

14

Hospital intensity rank* (Research spending as % of total hospital spending)

2

Researcher intensity rank* (Research spending per researcher)

4

Source: Research Infosource Inc., Canada's Top 40 Research Hospitals 2018
* Among medium hospitals (based on annual total hospital spending of \$400 million to \$1 billion)

Top media stories 2018

- Half of female students in Ontario experience psychological distress, CAMH study shows**
(Results from the 2017 Ontario Student Drug Use and Health Survey)
- What suicide notes teach us about experiences with mental illness and mental health care**
(Study published in the Canadian Journal of Psychiatry)
- People with schizophrenia account for more than 1 in 10 suicide cases**
(Study published in the journal Schizophrenia Research)

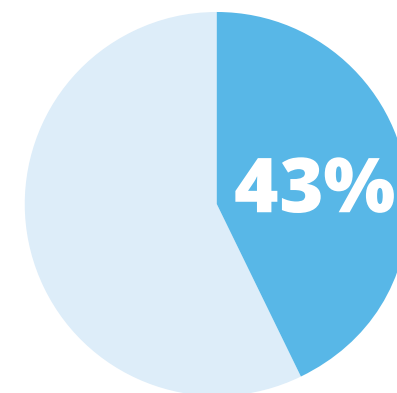
Media mentions



Total number of Research media mentions

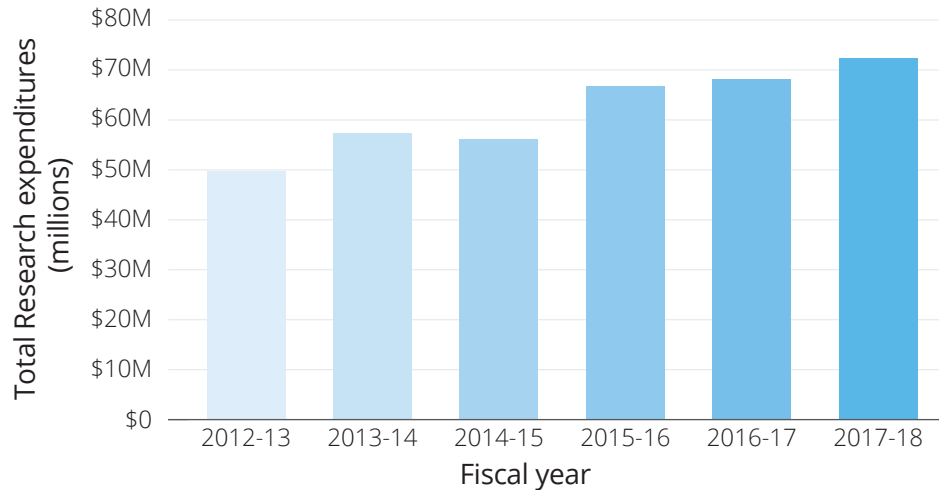
3,221

Research media mentions as % of total CAMH media mentions



Fiscal year 2017-18

Research expenditures



Funding sources include peer reviewed grants, base funding (indirect cost revenue from grants and contracts), internal/CAMH Foundation funding, government contracts, peer reviewed salary awards, industry contracts, university-administered grants, and other funding sources.

Publications and citations



Average number of citations per article

14.8

Articles published in peer reviewed journals

589

Source: SciVal, 2017



Translating discoveries into treatment

A4i: The App4Independence

App4Independence (A4i) is an app and web portal to support people with schizophrenia and psychosis, and is being developed in a joint venture between CAMH and MEMOTEXT Corporation. The mobile and web-based platform provides patient-informed tools, including medication and appointment reminders, evidence-based strategies to cope with symptoms, and peer-to-peer support. The platform will undergo broad user testing as the next step.

2018 MILESTONES

- Initial beta testing by users has been completed.
- A patent application was filed for the app's auditory hallucination detector.

A nutraceutical to prevent postpartum depression

Dr. Jeffrey Meyer has developed a natural health product with a unique combination of ingredients that replenishes essential brain chemicals to boost mood after childbirth. This CAMH-developed formulation is safe for use by breastfeeding mothers, and is now being studied in a randomized controlled trial.

2018 MILESTONES

- A U.S. patent was issued.
- A new company, Venessance Innovations Inc., was created.
- A large market research survey was completed, with highly favourable results.

A roadmap to long-term impacts

Our vision

CAMH research has a long-term vision based on revolutionizing the global understanding and treatment of mental illness:

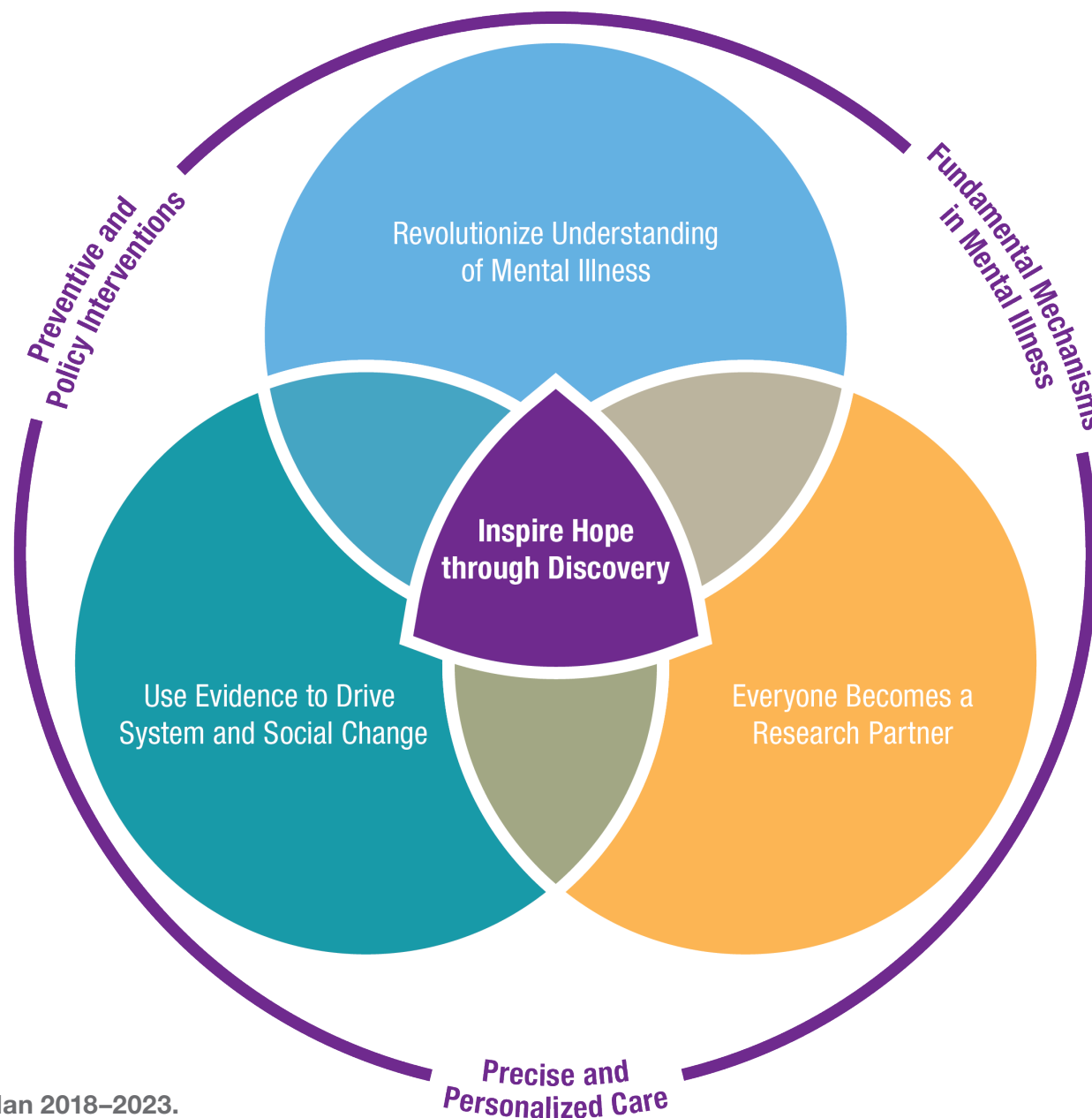
Inspire hope by discovering the causes of and cures for mental illness

Strategic directions

1. Revolutionize the understanding of the brain and the causes, biomarkers and treatments of mental illness.
2. Transform CAMH so that every patient, clinician and stakeholder becomes a partner in research.
3. Use evidence to drive system and social change to optimize care.

Domains of discovery

- Fundamental mechanisms (physiological, biological, social and developmental) in mental illness and brain health.
- Precise and personalized diagnosis, prevention, care and treatment options that transform outcomes.
- Preventive and policy interventions that reduce the burden of mental illness, including addictions, across populations.



Visit camh.ca to view the full CAMH Research Plan 2018–2023.

SIGNIFICANCE FOR PATIENTS AND FAMILIES

- ▶ Patients at CAMH will have access to current evidence, research-informed prevention and treatment regardless of their point of entry or provider.
- ▶ We will join collaborative efforts around the province, country and world to share access to leading practices in care and treatment.
- ▶ We will translate our research discoveries into new disease prevention, diagnostic and therapeutic options for patients at CAMH and around the world.

SIGNIFICANCE FOR SCIENTISTS AND RESEARCHERS

- ▶ We will understand what causes mental illness.
- ▶ We will continue to discover new ways to prevent and treat mental illnesses.
- ▶ Everyone associated with CAMH will recognize that they are contributing to knowledge that generates hope and recovery.
- ▶ Trainees and young scientists will see CAMH as the place to develop strength in methodologies and analytical thinking.



Inside the Campbell Family Mental Health Research Institute.



Patient engagement is a strategic direction.

CAMH Research Leadership

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Research Imaging Centre and Preclinical Research

Dr. Sylvain Houle, Director

Slaight Family Centre for Youth in Transition

Dr. Aristotle Voineskos, Director

Tanenbaum Centre for Pharmacogenetics

Dr. James Kennedy, Director

Temerty Centre for Therapeutic Brain Intervention

Dr. Jeff Daskalakis and Dr. Daniel Blumberger,
Co-Directors

WHO/PAHO Collaborating Centre

Dr. Kevin Shield, Head



Top left: Dr. Robert Mann observes the driving simulator, used to study effects of cannabis and other issues on driving responses.



Top right: Inside the Krembil Centre for Neuroinformatics.

Bottom left: Dr. Alex Abramovich is leading research into LGBTQ2S youth homelessness and mental health.



Bottom right: Inside a new one-stop-shop youth mental health clinic, opened as part of a CAMH-led study.



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