

CAMH Research
Strategic Plan 2013–2017







Dr. Bruce G. Pollock

Message from the Vice-President, Research

CAMH set bold goals last year with its *Vision 2020* strategic plan, goals that reach far beyond the walls of the hospital to transform society's understanding of mental health.

With the substantial growth of the research portfolio over the past 10 years—we have nearly tripled our grant income to \$38 million a year—the next step was to create a research strategic plan that supported this vision.

Our vision for research at CAMH is no less bold: Transforming Lives Through Research.

Aligning with *Vision 2020*, CAMH's Research Strategic Plan has three interconnected pillars in Brain Science (through the Campbell Family Mental Health Research Institute), Clinical Research, and Social and Epidemiological Research. This five-year plan sets out the key directions we need to take, with a strong emphasis on collaboration and enhancing capacity to conduct truly impactful research.

We are implementing this plan from a solid base. Our 124 scientists, and the hundreds of research staff, students and volunteers, are productive and committed. Whether they are working face-to-face with the most marginalized communities in Ontario, forging ahead with major international collaborations, or pushing themselves to deliver results using new, cutting-edge equipment, CAMH researchers are changing our understanding of mental illness and addiction in individuals and in society.

It is my hope that the ambitious plan laid out in these pages will inspire you to share our commitment to igniting discovery and innovation, to fulfill a promise of a better quality of life for the people and communities we serve, and beyond.

Bruce G. Pollock, MD, PhD, FRCPC

Vice-President, Research

Director, Campbell Family Mental Health Research Institute



CAMH Research: A Plan for the Future

The Centre for Addiction and Mental Health (CAMH) is Canada's leading research centre for mental illness and addiction. Over the past decade, CAMH Research has grown substantially, with an expansion of our facilities, acquisition of leading-edge technologies and a near-tripling of our research grant income to \$38 million a year. We also established the Campbell Family Mental Health Research Institute, Canada's only institute focused on brain science and mental illness. Our expertise also spans clinical, social and epidemiological research.

Mental illness and addiction continue to have an enormous impact on individuals and their families. Of the 10 leading causes of disability in Canada and worldwide, five are due to these disorders. However, fewer than half of affected individuals seek care. Of those who do, only half receive effective treatment. There is no single cause of any of these conditions, which is why there is a challenge in prevention, treatment and rehabilitation.

In recent years, public awareness and recognition of the importance of mental health, and of the impact of stigma, has increased dramatically. Over the same period, the field of brain science has grown rapidly. Due to advances in technology, we have learned more about the brain in the past decade than in all human history, offering new possibilities for understanding and treating mental illness.

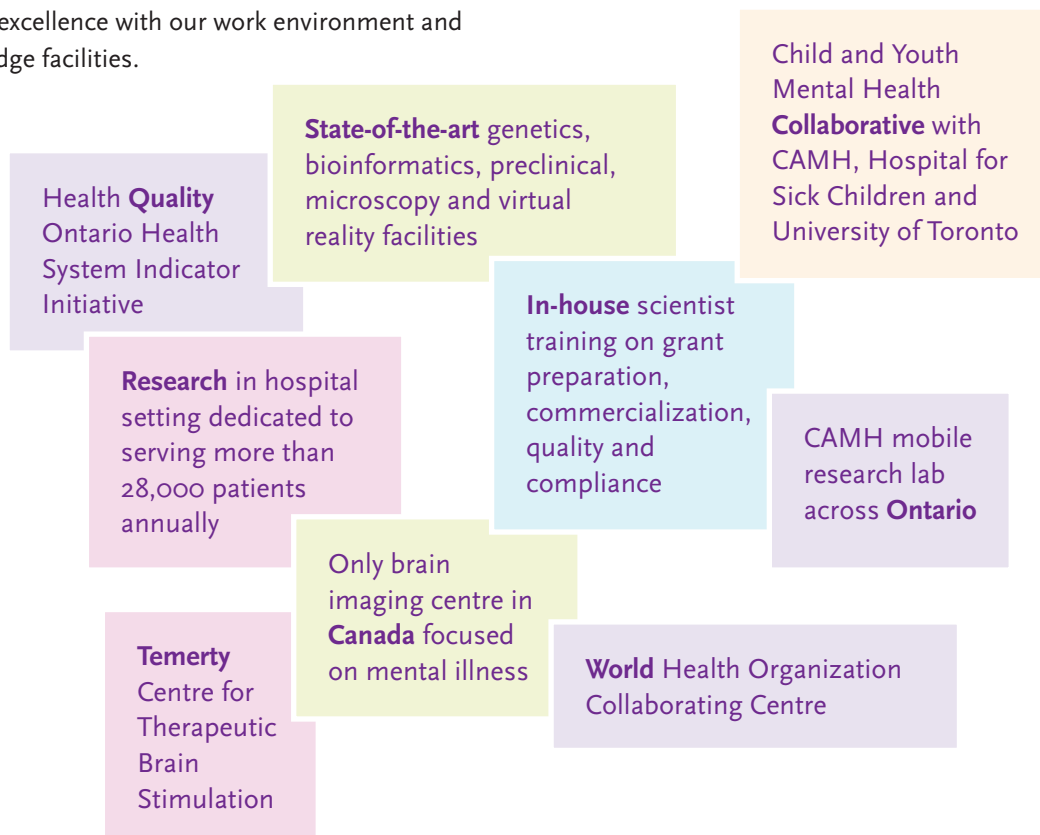
The *CAMH Research Strategic Plan (2013–2017)* outlines our priorities to make an impact in this context. Our plan is fully aligned with CAMH's *Vision 2020* strategic plan. We have identified four priorities: brain science, clinical research, social and epidemiological research and enhancing research capacity. We are committed to igniting discovery and innovation to fulfill the promise of a better quality of life for the people and communities we serve, and beyond.



Leveraging Our Research Advantages: What Sets Us Apart

CAMH's contributions to the field of mental health and addiction research are guided by the following principles:

- **Discovery to care:** We are committed to science that has an impact. The true value of research lies in its ability to improve the lives of the people we serve. We are committed to translating lab discoveries to clinical practice in the communities we serve, and beyond.
- **Interdisciplinary research:** The key to discovery is to make connections across disciplines. We promote collaboration across our research program to spur new ways of thinking.
- **Supporting our scientists:** Our people are the reason for our success. We recruit the brightest, most dedicated scientists and trainees, and continue to cultivate excellence with our work environment and cutting-edge facilities.
- **Partnerships:** Sustaining our research enterprise is crucial. We actively pursue strong partnerships with governments, private partners, and the mental health and addiction community, to ensure that there is stable support for our research and a wide reach for our findings.
- **Local, national and international presence:** Scientific advances have no boundaries and need wide dissemination to have an impact. CAMH has an active presence in the local, national and international policy and scientific communities so that our voice is part of the solution.



CAMH Research Strategic Plan Snapshot

OUR VISION	Transforming Lives Through Research		
OUR COMMITMENT	Our discoveries and innovations will lead to a better quality of life for the people and communities we serve and beyond.		
OUR RESEARCH PILLARS	BRAIN SCIENCE (Campbell Institute)	CLINICAL RESEARCH	SOCIAL AND EPIDEMIOLOGICAL
OUR AIMS	We will better understand brain structure and function to identify causes and best treatments for mental illness and addiction	We will conduct innovative, translational clinical research that positively impacts care	We will have a greater understanding of the complex factors that contribute to mental health and addiction, to inform community and system-level interventions, and public policy
OUR RESEARCH PRIORITIES	- Brain imaging - Molecular science - Genetics - Novel therapies	- Biological therapies - Psychosocial interventions - Clinical research training and capacity	- Biopsychosocial determinants - Social and community interventions - Health systems and policy research - Population health
	ENHANCING RESEARCH CAPACITY - Quality and Compliance - Commercialization - Bioinformatics - Scientist Development		
OUR IMPACT	- Generate new knowledge - Build research capacity and infrastructure - Cultivate world-leading scientists	- Improve clinical care and social interventions - Advance interdisciplinary research - Enhance knowledge translation	- Contribute to system improvements - Inform public policy - Effect social/economic change



Research Pillars and Foundational Supports

Research Pillars:

Brain Science (Campbell Institute)

CAMH's brain science, conducted within our new Campbell Family Mental Health Research Institute, is advancing the frontiers of our understanding of how genes, molecules, cells and neural circuits function in both healthy and disease states. Our scientists are engaging in leading-edge research to identify new therapies to treat mental illness and addiction. They employ a powerful set of tools and expertise in imaging, physiology, genetics, molecular biology and pharmacology to determine how new drugs or chemical changes function at each of these brain system levels.

Our researchers bring multiple talents to bear on any given clinical problem—such as eliminating troublesome side-effects for otherwise effective medications. Our geneticists are identifying, for each individual patient, which medications will work well and which ones may produce poor response or side-effects, thus greatly enhancing the success of our treatments and reducing health care costs.

Through our newly established Collaborative Centre for Drug Development, a partnership with the University of Toronto's Department of Pharmacology (within the Faculty of Medicine) and Leslie Dan Faculty of Pharmacy, our research is focusing on physiology, disease mechanisms and identifying novel biological targets for drug discovery.

In addition, our recently created Temerty Centre for Therapeutic Brain Intervention supports interdisciplinary investigation of brain stimulation treatments and innovative physiological measurements, contributing to the vital work of understanding severe psychiatric illnesses. The centre integrates brain research and clinical activities, which will contribute to increased treatment capacity and options for people who experience treatment-resistant psychiatric illness.

CAMH's brain science is at the forefront of research, translating new scientific knowledge into optimal clinical care for people with mental illness and addiction in our community and worldwide. Over the next five years, we will continue to integrate and strengthen our brain science with a focus on four priority fields of expertise and impact: brain imaging, molecular science, genetics and novel therapies.

Research Pillars:

Clinical Research

Outstanding evidence-based clinical care is at the core of what CAMH offers. We recognize that research is an essential component in the provision and enhancement of care for our unique clinical population. Building on the insights derived from our brain science, our clinical scientists are dedicated to growing the culture of research across all of CAMH. They apply their world-leading clinical and research expertise in the ethical and rigorous evaluation of treatments and interventions for people receiving care for mental illness and/or addiction. The ultimate aim of our research is to improve outcomes for everyone affected by mental illness and addiction.

CAMH's clinical research showcases the wide-ranging and multidisciplinary nature of our work. Our research spans across all forms of mental illness and addiction, and across all treatment programs at CAMH. Our clinical scientists are applying their world-leading expertise in evaluating treatments and/or interventions in areas including addictions, mood and anxiety, schizophrenia, child and adolescent psychiatry, geriatrics, and dual diagnosis. Studies currently underway are evaluating the effectiveness of new drugs for smoking cessation, anorexia nervosa, bipolar disorder and schizophrenia.

Our research on new psychosocial approaches for the serious disorders treated at CAMH include mindfulness meditation to prevent relapse in depression, cognitive-behavioural therapy for schizophrenia, and dialectical behavioural therapy for impulsivity and other behaviours that are common across a number of different disorders.

CAMH is unique in Canada in being able to conduct expansive multidisciplinary translational research across the lifespan. Our clinical research contributes to improved care and outcomes for the individuals receiving treatment at CAMH and, through translation and collaboration, to our broader communities and around the world. Over the next five years, we will continue to build research capacity across all of CAMH's clinical care programs by focusing on development in three key areas: biological therapies, psychosocial interventions, and clinical research training and capacity.

Research Pillars: Social and Epidemiological Research

At CAMH, social and epidemiological research recognizes that understanding the social basis for mental health and addiction is essential. Social factors such as poverty, trauma, discrimination and social exclusion are fundamental determinants of health and well-being. Using innovative methodologies and technologies (such as our mobile lab), our scientists are studying the impacts of these crucial determinants in many communities, and are working to ensure that findings translate into better care locally, nationally and internationally.

Working closely with our community partners, our world-renowned researchers are collaborating to ensure that evidence-based interventions are understood and are delivered appropriately. Effective therapies and scientific breakthroughs have maximum impact when they reach the people best positioned to implement them. Therefore, CAMH's applied social science research is critical in assessing the equity, effectiveness and efficiency of intervention strategies and in developing community-based approaches for prevention.

Our social and epidemiological research focuses on:

- understanding the etiology of mental illness and addiction, and important interdependencies between social factors and genetic and biological vulnerability
- developing evidence-based individual and societal interventions (both preventive and therapeutic) to reduce the burden of mental illness and addiction
- understanding the health care system for mental illness and addiction, and developing interventions to improve the system's effectiveness and efficiency
- understanding the impact of health policies and conducting controlled research to compare policy decisions
- translating and disseminating new research to policy-makers, physicians and other knowledge users.



Recognizing the significant global gaps in research, treatment and education capacity, CAMH partners with the World Health Organization and Pan American Health Organization, as a collaborating centre, to help train and build capacity to address mental illness and addiction in other parts of the world. Over the next five years, we will build research capacity in four areas: biopsychosocial determinants of health, social and community interventions, health system research, and population health.



Foundational Supports: Enhancing Research Capacity

CAMH's three research pillars rest on a strong foundation provided by our core support teams. Together, these specialized groups enhance the capacity of CAMH Research and help ensure that the work of our world-class researchers runs smoothly and has the maximum impact.

- The Research Services Office provides operational and administrative direction for the CAMH Research Program.
- The Research Finance group manages the financial aspects of post-grant and contract compliance. They activate and set up accounts, reconcile contracts, provide financial assistance and direction to our scientists, prepare financial reports for granting agencies and liaise with internal and external stakeholders.
- The Grants and Awards team is the primary CAMH liaison with peer-review granting agencies. This group supports researchers in the development of proposals and budgets, preparing non-financial progress reports, navigating funding agency guidelines, and providing editorial and grant-writing support. The Grants and Awards team also facilitates grant-related workshops and maintains research grant activity for stakeholder reports.
- The Research Legal Services group drafts, reviews and negotiates all research and research-related agreements prior to signature by the VP of Research. The team provides advice and prepares contracts for clinical trials, grants, sub-grants, confidential disclosures, data sharing, material transfers and licenses, thereby protecting our researchers and mitigating risk for CAMH.
- The Quality Assurance group supports researchers in developing, conducting and ensuring quality research projects. The role of this group includes promoting regulatory adherence and audit preparedness by providing education, tools and services to ensure compliance with research best practices.
- The Research Training group manages the on-boarding procedures for research trainees and administers the CAMH Fellowship competition. This group also co-ordinates and develops mandatory and supplementary education and training sessions for the CAMH research community. The goal is to ensure that all research at CAMH is conducted to high ethical and scientific standards, and to support compliance with regulatory requirements, research policies and CAMH policies and standards.
- The Industry Partnerships and Technology Transfer Office focuses on protecting CAMH discoveries by filing and prosecuting patents, and commercializing discoveries by licensing them to industry partners or establishing spin-off companies. The overall goal of the team is to support CAMH in translating scientific discoveries into practical applications that can be used to help understand, diagnose and treat substance use disorders and mental illness.
- The Bioinformatics group supports our researchers by analyzing vast amounts of data generated by current technologies. Using the most advanced gene sequencing equipment, a major goal is to analyze and understand the function of genes related to mental illness and to develop gene-based strategies for preventing, diagnosing and treating these illnesses. Supporting our genetics and imaging bioinformatics requirements is our Specialized Computing Centre, a powerful 22-node cluster of computers, and access to Canada's largest supercomputer centre, SciNet.
- CAMH recognizes that special conditions exist when conducting research involving vulnerable clients. The role of the Research Ethics Board (REB) is to ensure that only research that meets the highest ethical and scientific research standards is conducted under CAMH auspices. The REB is composed of members from inside and outside CAMH, and reviews a broad range of studies undertaken by our scientists.

Over the next five years, we will continue to build a strong foundation for our research program by focusing on quality and compliance, commercialization, bioinformatics and scientist development.



RESEARCH STRATEGIC PRIORITIES

BRAIN SCIENCE (Campbell Institute)

STRATEGIC PRIORITIES	DESCRIPTION AND EXAMPLES OF RESEARCH
BRAIN IMAGING	Brain imaging offers unique possibilities to advance our understanding and treatment of mental health and addiction. We will build on our world-leading integrated brain imaging research, which combines positron emission tomography (PET), magnetic resonance imaging (MRI) and genetics. We will provide a comprehensive state-of-the-art brain imaging platform that will be enhanced by new computational techniques. ■ Development of innovative tools to study brain chemistry and function with PET and MRI in depression, schizophrenia, addiction, neurodegenerative disorders and aging ■ New computational approaches to probe brain structures and their connectivity ■ Research on commonalities and differences in brain connectivity and neurochemistry across different clinical, mental and brain dysfunctions ■ Dedicated focus on under-researched populations such as youth, women and older adults
MOLECULAR SCIENCE	Molecular science in CAMH laboratories seeks to understand the mechanisms of psychiatric illness and addiction by analyzing specific molecules in the brain. For example, our molecular research on schizophrenia is focused largely on proteins involved in the growth, function and location of neurons in the brain. Supporting PET and MRI neuroimaging and other areas of research, our molecular science will contribute to the discovery of new treatments for mental illness and addiction. ■ Modelling of developmental processes of neurons by examining their chemical or genetic makeup ■ Advanced microscopy to examine changes in brain tissue ■ Research on how neurons and transmitter/receptor molecules interact before and after pharmaceutical treatments
GENETICS	Genetics as applied to mental health and addiction serves to identify the blueprints of various psychiatric illnesses, as well as resilience against disease. Our world-class research specializes in the genetics of drug action (pharmacogenetics), modifications of genes (epigenetics) and neuroimaging genetics. We will delineate the mechanisms of mental illness and addiction, and uncover new targets for the development of novel therapies. ■ Pharmacogenetics research to identify the DNA factors involved in medication response, as well as side-effects including weight gain and tardive dyskinesia. We will counteract trial-and-error prescribing, prevent side-effects and contribute to a reduction in health care costs ■ Epigenetics research to reveal how chemical modifications to a person's DNA alter risk for schizophrenia and mood disorders, and the effects of medication on the brain ■ Neuroimaging genetics to show how brain growth genes affect neural circuits that are involved in learning and memory, and the mechanisms underlying psychiatric illness



RESEARCH STRATEGIC PRIORITIES

BRAIN SCIENCE (Campbell Institute)

STRATEGIC PRIORITIES	DESCRIPTION AND EXAMPLES OF RESEARCH
NOVEL THERAPIES	Our interdisciplinary research in drug therapies will examine receptors and other molecules to uncover new pharmaceutical treatments for mental illness and addiction. Our investigation of new brain stimulation treatments will contribute to knowledge on the causes of severe mental illness and provide increased capacity to help people with treatment-resistant mental illness. ■ Research to identify new receptors or other targets that can be manipulated via medications to restore chemical balance in the brain ■ Interdisciplinary research through our Collaborative Drug Development Centre to drive discovery of new medications ■ Studies through the Temerty Centre for Therapeutic Brain Intervention on the use of magnetic brain stimulation and therapy to treat severe mental illness, and on brain mechanisms that change with treatment

RESEARCH STRATEGIC PRIORITIES

CLINICAL RESEARCH

STRATEGIC PRIORITIES	DESCRIPTION AND EXAMPLES OF RESEARCH
BIOLOGICAL THERAPIES	Our research on biological therapies seeks to identify the most effective interventions for the treatment of mental illness and addiction. Our research is far-reaching, spanning all mental illnesses and addictions across the lifespan. We will build capacity to conduct leading-edge clinical research across all four of CAMH's clinical programs (Complex Mental Illness, Ambulatory Services, Underserved Populations, and Access and Transitions). We will conduct methodologically sound, rigorous studies on the clinical treatments and interventions we provide, and we will ensure that our findings translate into enhanced care. ■ Translational research on the effectiveness of medications and treatments for specific mental illnesses and addictions ■ Research focused on developing the next generation of medications, using a targeted approach to change the behaviour of specific proteins, enzymes or other biological components ■ Research on understanding how medications affect brain chemistry and circuitry ■ Research on new applications for existing medications and drug tests, with a goal of improving outcomes and minimizing serious side-effects
PSYCHOSOCIAL INTERVENTIONS	CAMH's broad range of clinical research reflects the knowledge that successful recovery requires much more than medication. We are at the vanguard of developing innovative psychosocial interventions. Our research will continue to focus on understanding the full spectrum of symptoms associated with mental illness and addiction, and the innovative therapies that help maintain health and quality of life. ■ Translational research on the effectiveness of psychosocial inventions such as mindfulness, dialectical behavioural and cognitive-behavioural therapy, and home-based interventions for specific populations ■ Research focused on identifying new psychosocial treatment options ■ Studies evaluating the effectiveness of psychosocial therapies alone or in combination with drug therapies
CLINICAL RESEARCH TRAINING AND CAPACITY	Reflecting our commitment to enhancing clinical research at CAMH, we will build capacity and bolster scientific excellence in the recruitment of research subjects, and in the training, consultation and mentorship provided to our scientists and trainees across disciplines. We will ensure a high level of scientific rigour in clinical research across all of CAMH. ■ Through CAMH's Research Registry, promote ethical, organization-wide subject recruitment strategies for continuous enrolment into studies ■ Provide targeted training, support and mentorship for scientists and trainees on the range of required skills for clinical research, including data analysis and integrity, clinical research instrument administration, quality and compliance ■ Provide a full spectrum of biostatistical services to support researchers at all stages of their research through CAMH's Biostatistical Consulting Service



RESEARCH STRATEGIC PRIORITIES

SOCIAL AND EPIDEMIOLOGICAL RESEARCH

STRATEGIC PRIORITIES	DESCRIPTION AND EXAMPLES OF RESEARCH
BIOPSYCHOSOCIAL DETERMINANTS	Understanding the etiology of mental illness and addiction is at the core of CAMH's research on biopsychosocial determinants. Our research will focus on the complex interactions of biological, social and environmental factors in the development of mental illness and addiction. ■ Greater understanding of social determinants of health; with targeted focus on stigma, discrimination, trauma and poverty ■ Community-based studies exploring the links between genetic sensitivity, social and environmental factors and stress in relation to mental health substance use/addiction and violence problems ■ Research to explore the role of trauma in the etiology of mental illness and addictions
SOCIAL AND COMMUNITY INTERVENTIONS	Working closely with our community partners, our world-renowned researchers are collaborating to ensure that evidence-based interventions are understood and are delivered appropriately. We will continue to create, enhance and evaluate individual and community-level interventions in order to build a knowledge base and reduce problems related to mental illness, addiction and substance abuse. ■ Research to develop interventions to reduce stigma, both in the community and among health professionals ■ Development of interventions and policies focused on adolescents and young adults; focus on prevention, promoting education, self-help mechanisms and brief interventions
HEALTH SYSTEM RESEARCH	CAMH researchers are committed to improving the effectiveness and efficiency of our health care system. Our research will examine the organization of our health care system as a whole, and we will create evidence for policies that improve mental health and addiction care across Ontario and Canada. ■ Performance measurement of addiction and mental health service delivery systems ■ Research on improving access in marginalized populations; integrative research on improving systems serving Aboriginal (First Nations, Métis and Inuit) communities ■ Community partnerships to evaluate the effectiveness of government policies ■ Research to reduce workplace mental health and addiction problems ■ Research on mental health and addiction in the criminal justice system
POPULATION HEALTH	CAMH's applied social science research is critical in assessing the equity, effectiveness and efficiency of interventions at the population level. Our population health research will evaluate addiction and mental health indicators, risk factors, interventions and policies. ■ Development of a monitoring system for mental health and addiction indicators ■ Partnership with community groups to conduct a comprehensive review of indicators that will help identify specific needs (e.g., ethnic, sexual orientation, socio-economic status) ■ Support of CAMH's role as a WHO/PAHO Collaborating Centre by performing global research on alcohol and health



RESEARCH STRATEGIC PRIORITIES

ENHANCING RESEARCH CAPACITY

STRATEGIC PRIORITIES	DESCRIPTION AND EXAMPLES OF RESEARCH
QUALITY AND COMPLIANCE	At CAMH, we are committed to achieving optimal quality and compliance in our research studies. We will strengthen our infrastructure to support these objectives within research. We will ensure the safety of research participants and the integrity of study data while promoting compliance with all applicable regulations, guidelines, CAMH policies and standard operating procedures (SOPs). ■ Fostering a culture of continuous quality improvement and accountability that promotes consistency and best practices in our research ■ Standardized quality assurance (audits) and continuous oversight (monitoring) of studies ■ Policies, SOPs and guidance documents that will help investigators to ensure quality and compliance in their research studies ■ Comprehensive education sessions and team-based training for those conducting human subject research, to foster research best practices
COMMERCIALIZATION	At CAMH, we are committed to translating our scientists' research findings into practical applications to benefit all people affected by mental illness and addiction. We will identify and protect new discoveries, and will develop commercialization strategies to ensure that our leading-edge technologies are translated into innovative diagnostic and treatment options. ■ Enhancing the profile and reputation of CAMH as a resource for the pharmaceutical and biotech industries ■ Continuing to build an entrepreneurial culture at CAMH ■ Identifying and protecting CAMH's inventions as appropriate ■ Enhancing the process of technology transfer through successful partnerships with industry and not-for-profit organizations
BIOINFORMATICS	Bioinformatics is a rapidly evolving interdisciplinary field that uses advanced computer technology to store, retrieve, organize and analyze vast amounts of biological data. CAMH's current bioinformatics activities cut across multiple disciplines such as pharmacogenetics, epigenetics and neuroimaging, and across clinical programs ranging from children and youth to geriatrics. Building on our substantial expertise and computational capacity, we will make a significant contribution to bioinformatics-driven research, and we will create a rich data resource for researchers across fields and disciplines. ■ Managing, integrating, analyzing and leveraging of biomedical and clinical data to answer complex research questions ■ Storage of, access to and movement of vast amounts of data ■ Consultation and support to CAMH scientists on complex techniques, new programming algorithms, and data quality control and management ■ Alignment of bioinformatics resources with CAMH's new clinical informatics infrastructure (translational bioinformatics)



RESEARCH STRATEGIC PRIORITIES

ENHANCING RESEARCH CAPACITY

STRATEGIC PRIORITIES	DESCRIPTION AND EXAMPLES OF RESEARCH
SCIENTIST DEVELOPMENT	Our scientists are at the heart of our success as a world-renowned research facility. We will continue to recruit the brightest, most dedicated scientists, and will provide our trainees with fertile ground to engage in interdisciplinary research and career development. Our scientists and trainees will be supported to help them to achieve excellence in their work. ■ Fellowship training with curriculum that includes Good Clinical Practice and research guidelines as well as career development and progression towards becoming an independent scientist ■ Support for scientists to obtain grant funding and seed funding for promising new studies ■ The Discovery Commercialization Fund to support proof of principle projects that show promise for commercialization

MOVING FORWARD: MONITORING OUR PROGRESS

As we move forward with the ambitious plan outlined in these pages, we are committed to monitoring our progress toward achieving our aims. Our research leadership will develop and report on annual activities that support our strategic priorities, and we will contribute to CAMH's annual Balanced Scorecard by tracking key indicators of success in the "Discover" domain. We will also ensure that we draw upon the expertise of our stakeholders through our Research Subcommittee to the Board of Trustees and our Community Research Advisory Committee.



