Canadian Institutes of Health Research | Instituts de recherche en santé du Canada

Changing the Paradigm of Brain Health Research

Institute of Neurosciences, Mental Health and Addiction
Strategic Priorities
2012-2017

CIHR IRSC
Canadian Institutes of Health Research | Instituts de recherche en santé du Canada

Canada

Neurodevelopmental Disorders Brain Tumours Addiction Sensory Disorders Alcohol
Abuse Spina Bifida & Hydrocephaly Amyotrophic Lateral Sclerosis Pathological
gambling Autism Eating Disorders Bipolar Disorder Hearing Disorders Chronic
Pain Chronic Traumatic Encephalopathy Attention Deficit Hyperactivity Disorder
Cognitive Disorders Communication Disorders Dyslexia Angelman Syndrome
Dementia Depression Cerebral Palsy Pain Encephalitis Age-Related Macular
Degeneration Fetal Alcohol Spectrum Disorder Smoking & Tobacco Dependence
Heritable Ataxias Memory Loss Anxiety Disorders Mental Illness Spinal Muscular
Atrophy Migraine Substance Use Disorders Muscular Dystrophy Neurodegenerative
Eye Diseases Obsessive-Compulsive Disorder Panic Disorders Huntington Disease
Personality Disorders Learning Disorders Childhood Epilepsies Peripheral Nerve
Disorders Post-Traumatic Stress Disorder Schizophrenia Mood Disorders Sleep
Disorders Multiple Sclerosis Epilepsy Spinal Cord Injuries Early-Onset Mood &
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FROM ANTHONY PHILLIPS

Scientific Director's Message

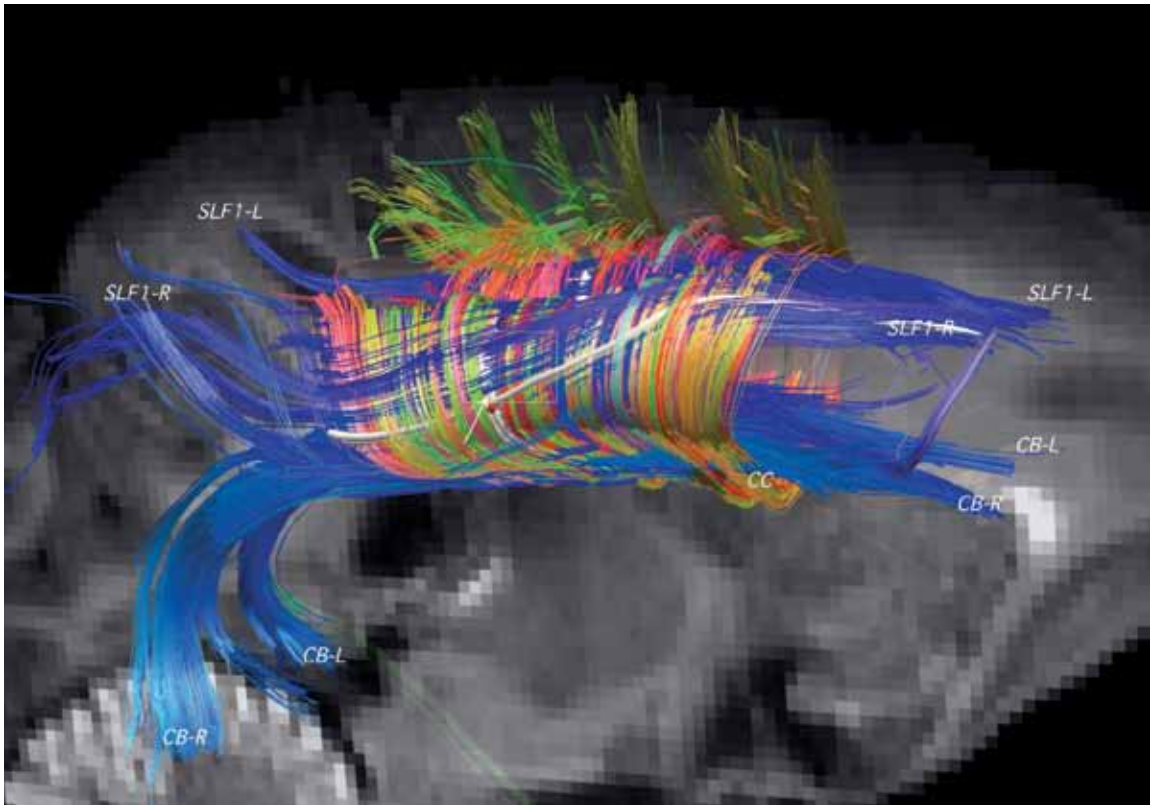
Dr. Anthony Phillips, Scientific Director, CIHR Institute of Neurosciences, Mental Health and Addiction (l) and Dr. Allan Young, Director of the UBC Institute of Mental Health (2008-2011) (r), walking the alleyways in Vancouver's Downtown Eastside.

As INMHA moves into its second decade, now is an ideal time to build on the remarkable accomplishments and lessons learned during the stewardship of Dr. Rémi Quirion, the Institute's Founding Director. This is also an opportune moment to prepare for a future that will bring new challenges and exciting opportunities to show that research can indeed improve the health and well being of all Canadians. INMHA is strongly committed to addressing a broad range of clinical conditions related to dysfunctions of the brain, spinal cord and peripheral nervous system. In order to fulfill this promise, we must harness new insights into the complex interplay between neurobiological, environmental and social determinants of perception, cognition and emotion and their influence on neurological conditions, mental health, addiction and senses disorders. INMHA's Strategic Plan 2012-2017 is effectively a companion to CIHR's Roadmap, and outlines how the Institute will develop its own unique vision within the context of the eight Signature Initiatives that comprise CIHR's core strategic commitments.

The study of the human brain is arguably the most challenging project undertaken in the history of science and yet through the concerted and collaborative efforts of neuroscientists both within Canada and throughout the world, the brain is slowly yielding its secrets.

Documents prepared by INMHA[1-2] for the second International review of CIHR in 2011 confirm the strength of neuroscience, mental health, addiction, and senses research in Canada. The subsequent report by the International Expert Review Team[3] complimented INMHA on its strategy of championing larger transformative initiatives designed to mobilize innovations in basic and clinical neuroscience and made recommendations to further enhance INMHA's impact in brain health research. All of the Expert Review Team's recommendations have been integrated into this new Strategic Plan. Specifically, we pledge to enhance communications and public relations, improve consultation with stakeholders and investigators, increase collaboration and partnerships, review the strategy for capacity development, and to explore ways to maintain the continuity of effective and successful research teams, while ensuring support for new investigators who are key to the continued success of CIHR.

The study of the human brain is arguably the most challenging project undertaken in the history of science and yet through the concerted and collaborative efforts of neuroscientists both within Canada and throughout the world, the brain is slowly yielding its secrets. Our understanding of brain functioning – inclusive of the central, peripheral, sensory and motor nervous systems as well as cognitive and psychological functions – has evolved dramatically over the last decade. In particular, it is widely recognized that brain development and function are shaped not only by genetics, biological and environmental factors, but also by complex psychosocial interactions including socioeconomic status. Many of the risk factors that predispose individuals to chronic brain-related illnesses arise early in life, therefore the development of innovative transdisciplinary programs designed to increase our understanding of mental health and addiction disorders must reflect these realities.



This image shows the 3-D gridlike structure of the callosal and association pathways in the rhesus monkey frontal lobe. It not only highlights the sophistication of brain imaging, but emphasizes the fact that brain pathways, though complex, are also more highly organized previously believed. Brain image courtesy of AAAS/Science. With thanks to Dr. Wedeen. (Van J. Wedeen, et al., The Geometric Structure of the Brain Fiber Pathways, Science, 2012; [DOI: 10.1126/science.1215280]).

These disorders not only pose very real threats to the quality of life of many Canadians, they also pose a major challenge to Canada's capacity to provide adequate and appropriate health services to all citizens.

It is clear that a new vision for brain health research is emerging, one that promotes close co-operation between the different preclinical and clinical neuroscience specialties, and moves away from a siloed perspective toward a more comprehensive, integrated approach to complex disorders that arise from abnormal brain function. INMHA is committed to leading this paradigm shift by encouraging new approaches to the characterization of causative factors that give rise to mental ill health, addiction, dementias, and the panoply of neurodegenerative disorders. These disorders not only pose very real threats to the quality of life of many Canadians, they also pose a major challenge to Canada's capacity to provide adequate and appropriate health services to all citizens.

As we look to the future, I am confident that INMHA and its broad-based community of researchers, health professionals, community partners and individuals with lived-experience will embrace the challenges on the horizon. Together, we will enable the human and fiscal capital required to translate insights arising from a better understanding of the complex interplay between brain function and the interpersonal and environmental factors that govern the human condition. These advances will also underpin a shift towards prevention, early detection strategies, and quality of life issues, along with collaborative efforts to improve research on how best to provide adequate and appropriate health services related to mental ill health and addiction.

In closing I wish to thank the remarkable cohort of 48 individuals who have served on the INMHA Institute Advisory Board at various times since its inception in 2001, under the insightful leadership of the Founding Scientific Director Dr. Rémi Quirion. We owe a special debt of gratitude to Dr. Ravi Menon who guided us successfully through the shoals of the recent International Review. I am also pleased to acknowledge that INMHA has and continues to benefit enormously from a gifted pool of dedicated and highly accomplished professional staff members, in Ottawa, at McGill University and the University of British Columbia.

Dr. Anthony G. Phillips, PhD, FRSC, FCAHS

Scientific Director

CIHR Institute of Neurosciences, Mental Health and Addiction

30% of people diagnosed with a **mental illness** will also have a **substance-use problem** in their lifetime, and 37% of people who abuse alcohol (53% of whom also abuse other drugs) are also living with a mental illness.[4]

The leading **neurodegenerative disorders** – Alzheimer's disease, amyotrophic lateral sclerosis (ALS), cerebral palsy, epilepsy, multiple sclerosis, and Parkinson's disease – are estimated to cost Canadians over **$8 billion** per year.[5]

The **financial burden of vision loss** in Canada in 2007 estimated at $15.8 billion. Of that amount, direct costs to the health system were $8.6 billion. Indirect costs (lost productivity, forgone taxation, welfare payments, home modifications, vision aids, etc.) totalled $7.2 billion. **By 2032,** vision loss expected to cost Canadians **$30.3 billion.**[6]

One in five people suffer from moderate to severe **chronic pain;** one in three are unable or less able to maintain an independent lifestyle due to their pain.[7]

The proportionate share of the total global burden of disease due to **neuropsychiatric disorders** is projected to rise to 14.7% by 2020.[8]

THE BURDEN OF

Neurological, Mental Health and Substance-Use Disorders

The World Health Organization reports that neuropsychiatric disorders are the leading aggregate cause of disease burden in Canada and the United States, accounting for 28.5% of disability-adjusted life years.[9] The impact on the Canadian economy is staggering: when direct and indirect costs of neurological disorders and mental illness are tallied, they amount to $61 billion per year.[10] In Europe the latest estimates of the cost of brain disorders are almost US $1 trillion – more than cancer, cardiovascular disease and diabetes put together.[11]

Apart from the economic impact, there are other significant obstacles faced by those with mental illness and substance-use disorders, as well as by people with progressive neurological and degenerative diseases including amyotrophic lateral sclerosis, Alzheimer's Disease, Parkinson's Disease, multiple sclerosis, and nervous system trauma. Social stigma, prejudice, and diminished quality of life culminate in a heavy burden, not only on affected individuals, but also on their families and caregivers. When taken together the social and economic burdens of brain-related disorders can be devastating at a personal level, are profound at a societal level, and globally, are immense.

Increasingly we recognize that biological, social, physical and environmental factors that shape the brain and regulate brain health throughout an individual's lifetime form a complex interaction that cannot be addressed solely on the basis of genetic factors.

The importance of investing in basic and clinical brain health research remains paramount. There is a pressing need for INMHA to identify opportunities to translate and apply new findings to the development of novel diagnostics and therapeutics, while also meeting the need to contribute to improvement of health systems and services related to our mandate. Increasingly we recognize that biological, social, physical and environmental factors that shape the brain and regulate brain health throughout an individual's lifetime form a complex interaction that cannot be addressed solely on the basis of genetic factors. Therefore a multidisciplinary and integrated research approach that acknowledges the role each of these factors plays is imperative if we are to gain a full appreciation of the links between brain function and disease.

INMHA'S RESEARCH MANDATE:

Addressing the Complex Nature of Brain Health and Brain-Related Illness

At the inception of CIHR, INMHA was charged with the mission to foster excellence in innovative and ethically responsible research that aims to increase knowledge of the normal function and disorders of the brain and mind, the spinal cord, the peripheral nervous system, and the senses.

INMHA supports initiatives that mobilize and link scientists in collaborative programs across multiple research domains. The Institute is committed to fostering the translation of the knowledge gained from these programs into improved healthcare for Canadians. We do this by supporting interdisciplinary clinical research teams dedicated to linking new discoveries in basic and clinical brain health research to significant improvement in the treatment of mental illness, addiction, and the many forms of neurological conditions. INMHA continually seeks opportunities to foster health promotion and transform health care services that address brain-related diseases.

Brain health encompasses the physiological functioning of the nervous system, as well as factors linked to individual genetic profiles and to the multiple psychosocial and environmental inputs that affect the neural foundations for cognition, emotion and behaviour. These external factors range from acquired and traumatic brain and nervous system injuries, drug abuse and environmental toxins, including infectious agents, to life events such as child maltreatment, neglect, or the impact of personal losses that can affect an individual throughout life, most especially during early development and adolescence. Gender also plays a significant role in both the predisposition to and prevalence of nervous system disorders. The positive or negative impact of these multi-factorial inputs across the lifespan may generate strength, resilience, or vulnerability within the brain, which in turn affect the capacity of the individual to function in all spheres of life.

INMHA is proud of its investment in world-class neuroscience, mental health, addiction and senses research over the past decade and remains an advocate for these areas of research through the CIHR open and strategic grants competitions. The Institute remains committed to supporting new activities that promise to draw further benefits from past and current training initiatives, research ventures and major research collaborations.

There is an urgent need for new and more effective ways to foster innovative programs to optimize the economic return on CIHR's substantial investment in brain research that currently amounts to more than $130 million per year.

INMHA has been successful in leveraging its modest annual budget through a variety of national and international partnerships, thereby maximizing the number and range of opportunities available to its broad research community. Individual researchers and teams within the INMHA mandate have been supported by grants, awards and training programs from both the Institute's strategic grant budget and many other CIHR programs. Of particular note are the direct links between these programs and the ongoing support for national multidisciplinary research networks, such as NeuroDevNet and the Canadian Stroke Network, both funded by the Networks of Centres of Excellence. Support of basic biomedical research, initially by the Medical Research Council of Canada and later by CIHR, has also contributed to the emergence of several successful biotech companies, as exemplified by NeuroMed Pharmaceuticals, now Zalicus; but these are still too few in number. There is an urgent need for new and more effective ways to foster innovative programs to optimize the economic return on CIHR's substantial investment in brain research that currently amounts to more than $130 million per year. One option under active consideration is a public-private partnership based on the principles of open source access to basic and clinical research data.

Through opportunities such as the CIHR Café Scientifique, INMHA is sharing knowledge about how the social and environmental changes in gene activity and expression determine cognitive functioning and behaviour over the life span.

CIHR'S MANDATE

Health Research and Improvement of the Health of Canadians

The establishment of CIHR in 2000 was greatly influenced by three internationally acclaimed Canadian reports[12] that broadened our understanding of the factors that contribute to better health. While retaining basic and clinical aspects of health research, CIHR's new vision expanded to include social and environmental determinants of health (*see pullout below*).

For the past decade, CIHR has provided foundational support to Canada's health research community through funding, creating and fostering partnerships, building capacity by attracting and retaining highly qualified personnel, and advancing Canada's reputation for health research excellence.

What are the social determinants of health?

"Being healthy requires clean, safe environments, adequate income, meaningful roles in society, and good housing, nutrition, education, and social support in our communities. In fact, actions on these broad determinants of health through public policies have led to most of the improvement in the health status of Canadians over the last century. There is still much to do, however, if we want to reduce health disparities among various groups of the population and continue on the path toward better health for all." – Canada Health Action: Building on the Legacy - The Final Report (Vol. 1) 1997.[13]

CIHR recently made an important evolutionary step, reflected in the *"Health Research Roadmap: Creating innovative research for better health and health care (2009-2014)"*, which identified four strategic directions and five overarching priorities (*see next page*) for the duration of the five-year plan. The four strategic directions are:

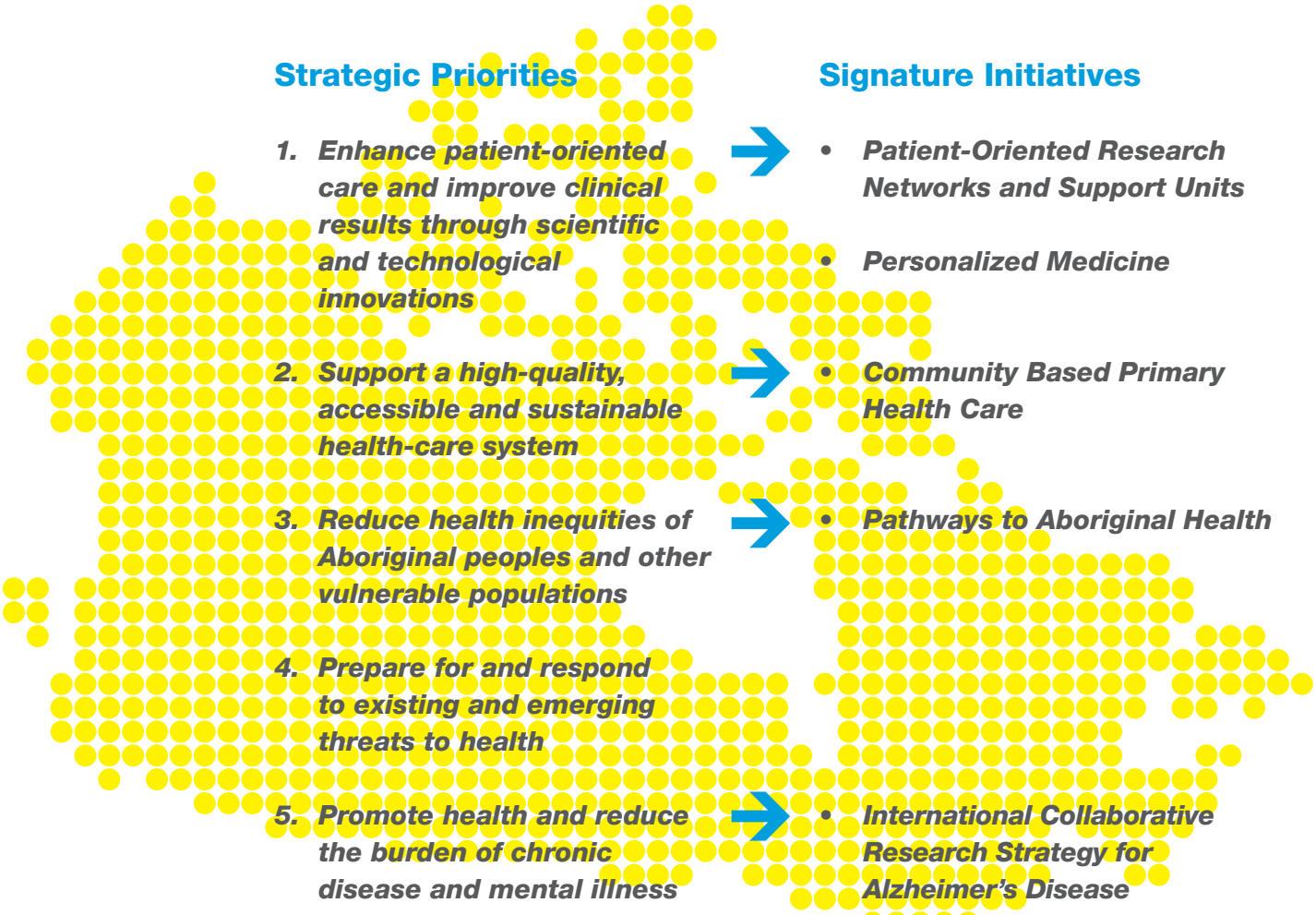
1. ***Invest*** *in world-class research excellence;*
2. ***Address*** *health and health system research priorities;*
3. ***Accelerate*** *the capture of health and economic benefits of health research; and*
4. ***Achieve*** *organizational excellence, foster ethics and demonstrate impact.*

This new approach also commits strongly to a translational research focus, to include implementation training, healthcare practice improvements, and capacity building.

By endorsing this forward-looking vision, individual Institutes including INMHA agree to align their activities with the Roadmap's strategic priorities. In addition to the Roadmap, CIHR has embarked upon a more strategic and targeted funding approach that involves eight major new Signature Initiatives.

CIHR ROADMAP

Strategic Priorities and Signature Initiatives



Strategic Priorities

1. ***Enhance patient-oriented care and improve clinical results through scientific and technological innovations***
2. ***Support a high-quality, accessible and sustainable health-care system***
3. ***Reduce health inequities of Aboriginal peoples and other vulnerable populations***
4. ***Prepare for and respond to existing and emerging threats to health***
5. ***Promote health and reduce the burden of chronic disease and mental illness***

Signature Initiatives

- ***Patient-Oriented Research Networks and Support Units***
- ***Personalized Medicine***
- ***Community Based Primary Health Care***
- ***Pathways to Aboriginal Health***
- ***International Collaborative Research Strategy for Alzheimer's Disease***
- ***The Canadian Epigenetics, Environment and Health Research Consortium***
- ***Inflammation in Chronic Disease***
- ***Evidence-Informed Health Care Renewal***

THE NEXT FIVE YEARS

INMHA's Strategy

While INMHA's strategic focus includes the development of novel pharmacotherapies and gene-based diagnostics to aid in the stratification of patient care, we will also seek opportunities through partnerships to influence the entire continuum of care including the identification of risk factors and causal mechanisms, novel care delivery strategies, assessment of preventive strategies and evaluation of appropriate interventions. In partnership with other stakeholders, INMHA will support research on best practices to improve mental health and addictions services and interventions.

INMHA will seek opportunities to enhance expertise and utilize the remarkable developments in brain health research to expand and create a more inclusive model of brain health that encourages the integration of neurology and psychiatry, along with the related disciplines of neuropathology, neurosurgery, and neuropsychology. In order to promote novel insights and advances into the understanding and treatment of brain-related illness, INMHA will foster connections across all disciplines, inclusive of economics, law, management, mathematics, physical, computer, social, and behavioural sciences. By expanding these connections through new partnerships both within CIHR and at national and international levels, INMHA will position its research community to harness the global wealth of information about biological, environmental, psychological and social determinants of a host of complex brain-related illnesses.

Over the next five years, INMHA will adhere to three key principles to fulfill our mission.

1. Optimize the Impact

INMHA will align research in brain health and illness with the CIHR Roadmap and the eight Signature Initiatives by allocating a significant portion of its budget over the next five years to these programs. The Signature Initiatives are designed for opportunities where large-scale investments in research have the potential to make a measurable impact on the improvement of Canadian health outcomes.

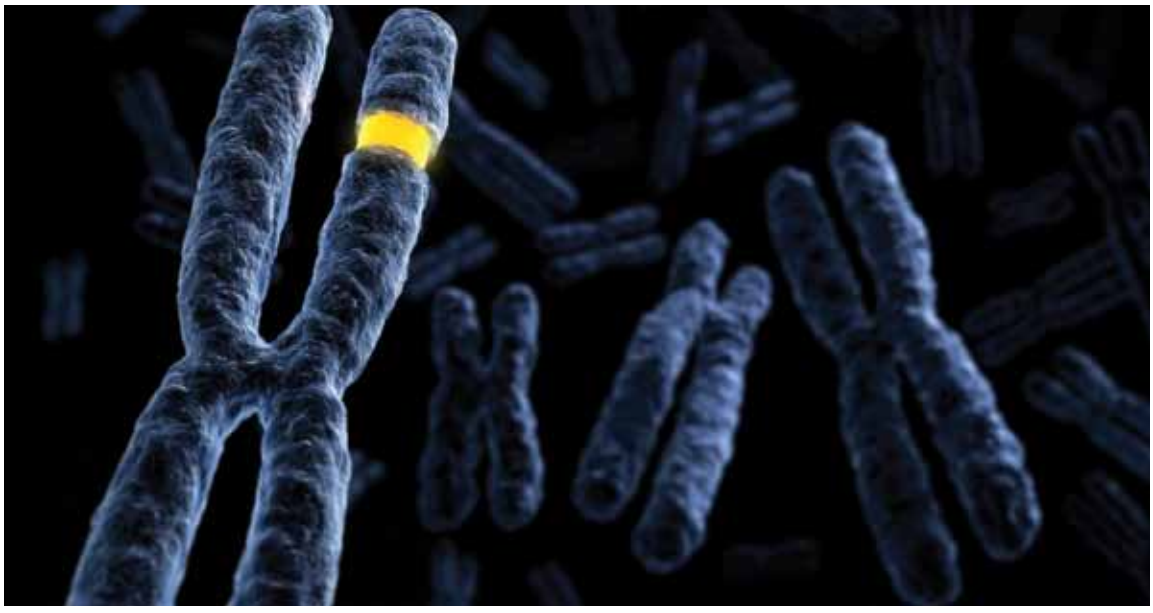
Each Signature Initiative will have a different timeline, level of progress and maturity: factors that will influence INMHA's participation over the next five years. The ability to establish strategic partnerships with other CIHR Institutes and external stakeholders will be a key determinant of the degree to which INMHA can engage with each of the Signature Initiatives.

Epigenetics has the capacity to show how the environment interacts with the genome, turning genes on or off, to influence short- and long-term health outcomes in an individual.

The Canadian Epigenetics, Environment and Health Research Consortium (CEEHRC)

INMHA has taken the lead on this ground-breaking Signature Initiative, along with the Institute of Genetics and the Institute of Cancer Research. Epigenetics has the capacity to show how the environment interacts with the genome, turning genes on or off, to influence short- and long-term health outcomes in an individual. It has been characterized as the second revolution in genetics, and refers to stable, long-term alterations in the transcriptional potential of a cell that do not involve direct changes to the nucleotide sequence. These marks are not necessarily heritable, but may lead to heritable changes in gene activity and expression (i.e., in the progeny of cells or of individuals).

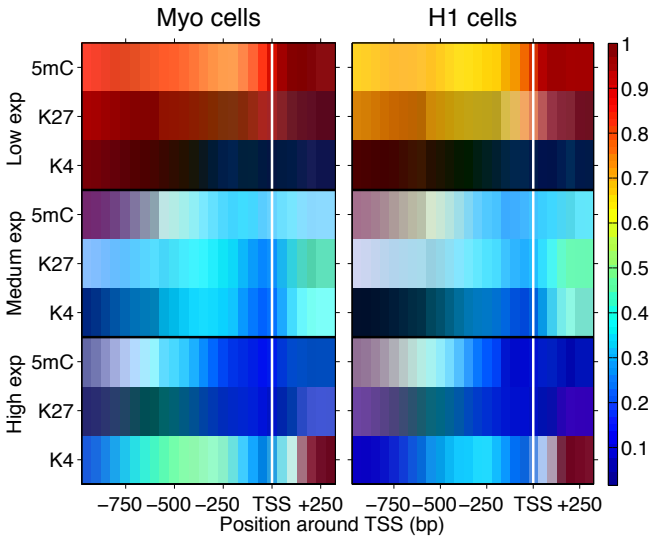
The aim of the CEEHRC Signature Initiative is to increase Canada's already internationally recognized capacity in health-related and behavioural epigenetics research by establishing a broad national network, building bioinformatics resources, and achieving excellence through a number of funding opportunities including training awards and team grants.[14] Given the growing understanding of the important interplay of epigenetic factors in the susceptibility to and the extent of neurological, mental health, and substance-use disorders, INMHA's community will be well served by opportunities to continue its ground-breaking research in these areas.



There are enormous opportunities to understand how social and environmental changes in gene activity and expression determine cognitive functioning and behaviour over the life span. INMHA's challenge will be to seek partnerships to catalyze and apply these findings through interdisciplinary and non-traditional approaches to healthcare issues, e.g., through psychosocial research, health economics, biomedical ethics, and population health strategies. This type of research will be supported in part by the new "Genomics and Personalized Health" partnership between CIHR and Genome Canada.

INMHA has also taken advantage of an unanticipated and timely opportunity to expand the CEEHRC program to include an international partner interested specifically in the epigenetics of stem cells. By being flexible and responsive to the development of a separate funding opportunity for team grants with the Japan Science and Technology Agency, INMHA has successfully leveraged CIHR's investment to create a new and innovative $14 million opportunity that supports Canada's world-class expertise in stem cell research.

For brain disorders, the concept of personalized medicine holds great promise given the prevalence of debilitating side effects of prescription drugs that can have a direct influence on patient compliance.



Epigenetic Heatmap of human embryonic stem cells and mammary cells. *Courtesy Dr. Martin Hirst, University of British Columbia*

Personalized Medicine

The ultimate goal of this Signature Initiative is to identify valid biomarkers that will assist in stratifying individuals – based on their susceptibility to a disease or their positive or negative response to a specific intervention – with the objective of matching them with the safest and most effective prevention strategies and interventions. For brain disorders, the concept of personalized medicine holds great promise given the prevalence of debilitating side effects of prescription drugs that can have a direct influence on patient compliance. Seven of CIHR's 13 Institutes, including INMHA are supporting a major new funding opportunity in "Genomics and Personalized Health" in partnership with Genome Canada.

INMHA will support research aimed at the application of genomics to patient stratification to minimize side effects of pharmacotherapies in the treatment of mental ill health and to advance the understanding of links between epigenetics and brain health, including Genomics and its related Ethical, Environmental, Economic, Legal and Social Aspects (GE^3LS) of epigenetic research. Advances from traumatic brain injury studies as well as research outcomes from the Alzheimer's Initiative also have the potential to inform and advance the area of personalized medicine as related to brain health.

Patient-Oriented Research Networks and Support Units

The overall aim of this initiative is to accelerate the translation of research results into improved health outcomes by investing in the creation of patient-oriented research networks across Canada, to coordinate research along thematic lines, and to link researchers across provinces and regions. Mental health and community-based primary healthcare have been identified as the first two thematic networks to be established through this Initiative.

Given the complexity of psychiatric illness and the need to focus on significant areas of unmet medical need, careful consideration must be given to selecting the scope of research activity for the Mental Health Clinical Research Network. Candidates may include depression, bi-polar disorder, anxiety, post-traumatic stress disorder, and schizophrenia.

Different aspects of an effective network will include a strategy for assessing the clinical efficacy of new diagnostics and therapeutics developed from ongoing research in basic and clinical brain research. Of equal importance will be support for research on the improvement of health services and access to care.

INMHA is committed to measuring the impact and outcome of the research it supports, with performance evaluation becoming a key component of every strategy and initiative.

INMHA is also exploring the development of a Canadian Intervention Network in Addiction aligned with the successful Clinical Trials Network in the United States, supported by the National Institute on Drug Abuse. Ongoing collaboration with the National Institute on Drug Abuse would ensure that Canadian network nodes could participate in US-led trials and vice-versa. As a first step in building national capacity for the Clinical Intervention Network in Addiction program, INMHA will provide fellowship training opportunities for Canadians within the Clinical Trial Networks across the United States.

Community Based Primary Health Care

The goals of this Signature Initiative are to improve access to appropriate community-based primary healthcare, enhance the patient experience, and contribute to better health outcomes. By contributing to health system and services research focused on knowledge translation of new discoveries in diagnosis and treatment in the area of mental illness and substance-use disorders, INMHA will support health research projects addressing access to care and improved quality of care provided by primary healthcare physicians and healthcare workers who form the first line of response to mental health and substance-use disorders.

International Collaborative Research Strategy for Alzheimer's Disease

This Signature Initiative is focused on the increasing healthcare burden of the debilitating effects of Alzheimer's Disease and related dementias. It is led by the Institute of Aging and INMHA serves as a co-lead. The first phase of this initiative established several international collaborations with the European Union, as well as a separate consortium with the United Kingdom, Germany, Ireland and Italy. Of special interest to INMHA as the lead institute for the Canada-China Joint Health Research Initiative is the successful launch of a new collaborative Teams call focused on vascular dementia.

The Alzheimer's initiative will also partner on the CEEHRC Team Grant funding opportunity designed to support Canadian teams investigating epigenetic marks associated with Alzheimer's Disease. Phase II of the dementia research strategy will expand the scope of neurodegenerative disorders to include Parkinson's Disease, Huntington's Disease and degenerative disorders arising from abnormal prion proteins in the brain. Collectively this initiative will form the Canadian Consortium on Neurodegeneration in Aging, again with INMHA serving as co-lead with CIHR's Institute of Aging.

The issue of inflammation and chronic disease is very relevant to INMHA's mandate: inflammation, particularly neuroinflammation, is a major biological variable accompanying aspects of brain disease, in particular, those at the interface of neurology and psychiatry.

Inflammation in Chronic Disease

The issue of inflammation and chronic disease is very relevant to INMHA's mandate: inflammation, particularly neuroinflammation, is a major biological variable accompanying aspects of brain disease, in particular, those at the interface of neurology and psychiatry. INMHA is well positioned to partner with the Institute of Aging and the Institute of Infection and Immunity on a number of potential team grants related to Inflammation and Neurodegeneration in Aging and Inflammation in Traumatic Brain Injury. Through this Signature Initiative, INMHA hopes to identify additional funding opportunities that will help further define and elucidate the immune-modulated basis of neurological disorders such as multiple sclerosis, chronic fatigue, fibromyalgia, depression, epilepsy, amyotrophic lateral sclerosis, as well as chronic pain and other nervous system disorders.

Pathways to Aboriginal Health

This Signature Initiative explores the complex set of unique social, cultural, environmental and physical challenges faced by Canada's Aboriginal Peoples, which has resulted in disproportionately high rates of suicide, substance use disorders, depression and other mental health issues. The Institute of Aboriginal Peoples' Health will focus on Aboriginal health inequities across four specific exemplar areas: suicide, obesity, tuberculosis, and oral health. INMHA will partner with the Institute of Aboriginal Peoples' Health to develop a plan for the better understanding of factors related to suicide and for assessing effective intervention strategies.

Evidence-Informed Health Care Renewal

This Signature Initiative is intended to help researchers and decision-makers work together to advance the current state of knowledge, generate novel and creative solutions, and translate evidence for uptake into policy and practice to strengthen Canada's health care systems. It provides the opportunity to use evidence based on brain health research to better inform decisions concerning the development of optimal strategies to meet the long-neglected challenges of mental ill health and addiction.

2. Be Responsive, Flexible, and Focused

INMHA will maintain an entrepreneurial approach in exploring new paths to accelerate the discovery and translation of research focused on brain-related ill health, to leverage resources, and to foster relationships. To this end, we will seek appropriate national and international partnerships in an ongoing commitment to foster multidisciplinary collaboration between different health research sciences – e.g., advocating with physics, bioinformatics, computer sciences, and social sciences communities – to analyse and model disease, and to develop tools and methodologies. INMHA will also seek collaborations with appropriate non-governmental groups and stakeholders.

Taking this approach, INMHA recently joined the International Initiative for Traumatic Brain Injury Research along with the Research and Innovation Directorate of the European Union and the National Institute of Neurological Disorders and Stroke at the US National Institutes of Health. Two key objectives of this consortium are to advance clinical research and care through the identification of best practices for early diagnosis and early treatment interventions. In alignment with the international objectives, in April 2012 INMHA hosted a consultation workshop to further build upon the Canadian Research Strategy for Traumatic Brain Injury developed by the Ontario Neurotrauma Foundation and its national stakeholders.

The formulation of a national and international Traumatic Brain Injury research strategy is timely and urgently needed given the increasing awareness and concern about the links between brain injuries arising from motor vehicle accidents, sport-related concussions and falls, particularly among children and adolescents, and the subsequent loss of cognitive functioning and possibly early-onset dementia. It is also a concern that multiple, mild traumatic brain injuries in youth appear to be related to subsequent substance-use disorders and mental illnesses. In partnership with the Fonds de recherche du Québec - Santé, the Hotchkiss Brain Institute, and the Ontario Neurotrauma Foundation, INMHA has undertaken to bring greater emphasis to the implementation of research results into practice and policy through the development of a clinical research Team Grant focused on mild traumatic brain injury.

Dr. Alain Beaudet, President of the Canadian Institutes of Health Research (l) and Dr. Michiharu Nakamura, President of the Japan Science and Technology Agency (r) at a signature ceremony in Ottawa, January 4, 2012, where the two agencies signed a $14M collaborative agreement to support research in the epigenetics of stem cells.

3. Seek Partnerships in Knowledge Translation

INMHA will continue to seek new and creative ways to realize its commitment to knowledge translation. By emphasizing brain health research as a primary goal, INMHA will encourage the integration of preclinical and clinical research in neurosciences, mental health, substance-use disorders and the senses. Taking an integrative approach across the research spectrum, the Institute commits to the translation of unique discoveries into new policy, diagnostics, treatment approaches, and products.

Through a proactive communications plan INMHA will seek greater engagement of people living with neurological conditions, mental health problems and illnesses, and their families, in addition to their health care and support providers.

The CIHR Roadmap emphasizes aspects of citizen engagement, evaluation and ethics. CIHR views citizen engagement as a significant part of all its activities, from governance to the peer review process. Through a proactive communications plan INMHA will seek greater engagement of people living with neurological conditions, mental health problems and illnesses, and their families, in addition to their health care and support providers. This new approach includes proactive media and website communications of our community's successes, press releases, Cafés Scientifique, public information and education events, and outreach to all our stakeholders.

INMHA is committed to measuring the impact and outcome of the research it supports, with performance evaluation becoming a key component of every strategy and initiative. Clearly defined measures to evaluate outcomes will be embedded in projects from the start, using a logic model approach, and projects will be structured so that researchers are continually monitoring their progress. End-of-grant reporting at CIHR is already becoming standard practice. By collecting and reporting this information, CIHR will provide a full picture of the impact of its investments.

Ethics is often understood as a requirement of compliance. However, we are proud to say that INMHA has been a world pioneer in the area of neuroethics. The Institute will continue to seek opportunities to further enhance the integration of biomedical ethics into all new projects and initiatives related to mental illness and addiction. INMHA will be assisted in these endeavours by its close working relationship with the International Neuroethics Society and a dedicated Chair in neuroethics hosted at the University of British Columbia.

Dr. Judy Illes, Canada Research Chair in Neuroethics and Professor of Neurology (l) and Dr. Peter Reiner, Professor, Department of Psychiatry (r), at the National Core for Neuroethics office, located at the University of British Columbia. *Photo: Don Erhardt Photography.*

LOOKING TO THE FUTURE

Summary and Concluding Remarks

This narrative makes repeated reference to the essential roles of preclinical and clinical neuroscience in the understanding and treatment of a host of disorders ranging from autism to Rett Syndrome, Alzheimer's Disease to schizophrenia, while emphasizing the need for new paradigms to accelerate translation of this knowledge into improved diagnostics and therapeutics that will transform treatment strategies for disorders of brain function. This emphasis on Brain Health also recognizes the critical roles of environmental and psychosocial factors in the form of proper nutrition, appropriate parental support and effective social networks in ensuring optimal brain and behavioural functions essential for good mental health. Accordingly, INMHA will continue to champion multidisciplinary research that seeks to integrate neurobiological, environmental and psychosocial factors into the better understanding of disorders of the brain, spinal cord and peripheral nervous system. Canada's efforts will be buttressed by key international partnerships to gain additional leverage for our investments, while also ensuring that our scientists take their well-deserved place on the larger world stage. INMHA will also forge close partnerships with colleagues whose expertise lies in public health and health services research to ensure that new effective treatments are shared with leaders in health care delivery.

Although we are currently experiencing challenging economic times, there is every reason to believe that funding for programs outlined in this Strategic Plan is secure. The resources required to bring these objectives to reality will come mainly from partnerships with other CIHR Institutes, CIHR Corporate initiatives focused on the Patient-Oriented Research Networks and Support Units, as well as academia, not for profit organizations, and the private sector, including ethical alliances with corporations in the pharmacological and biotechnology sectors. Signature Initiatives in Epigenetics and Personalized Medicine have been launched in 2012, while INMHA continues to work closely with the Institute of Aging to develop a national program for Alzheimer's research and other neurodegenerative disorders of the brain. Funds have also been committed by INMHA in support of the Signature Initiative on Inflammation in Chronic Disease.

Of special importance to those seeking major new investments in mental health research in Canada, is the approval of this focus in early 2012 by the Patient-Oriented Research Networks and Support Units. A minimum of $25 million is budgeted for this Network. This new initiative will provide fertile ground for closer collaboration with the Mental Health Commission of Canada. INMHA looks forward to working closely with Brain Canada and the Canadian Association for Neuroscience in the development of the Canada Brain Research Program to ensure that this welcome new investment of $200 million by the Government of Canada and

INMHA's overall objective is to ensure a more integrated approach to patient care, emphasizing brain health research across the healthcare spectrum from biomedical and clinical, to health systems and services, and to the social, psychological, cultural and environmental factors that affect the health of populations.

the private sector is truly transformative in nature and is complemented by the wide range of strategic programs described in this Strategic Plan.

INMHA's overall objective is to ensure a more integrated approach to patient care, emphasizing brain health research across the healthcare spectrum from biomedical and clinical, to health systems and services, and to the social, psychological, cultural and environmental factors that affect the health of populations. Within five years we hope to see clear evidence of change in the brain health paradigm that reflects closer collaboration between preclinical and clinical neuroscience researchers. Closer interactions should set a precedent for clinical practice thereby ensuring that patients presenting with disorders of mood, cognition, perception or movement receive integrated care from teams of neurologists, psychiatrists and other health professionals working in close collaboration.

Please join us on this journey.

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Within five years we hope to see clear evidence of change in the brain health paradigm that reflects closer collaboration between preclinical and clinical neuroscience researchers.

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