



HEALTH RESEARCH ROADMAP II:
CAPTURING INNOVATION TO PRODUCE
BETTER HEALTH AND HEALTH CARE
FOR CANADIANS

STRATEGIC PLAN
2014-15 – 2018-19

HEALTH RESEARCH ROADMAP II: CAPTURING INNOVATION TO PRODUCE BETTER HEALTH AND HEALTH CARE FOR CANADIANS

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**CAPTURING INNOVATION TO
PRODUCE BETTER HEALTH AND
HEALTH CARE FOR CANADIANS**



ABOUT CIHR

MANDATE

The mandate of the Canadian Institutes of Health Research (CIHR) is to “excel, according to internationally accepted standards of scientific excellence, in the creation of new knowledge and its translation into improved health for Canadians, more effective health services and products and a strengthened Canadian health care system” (Bill C-13, April 2000).

VISION

CIHR's vision is to position Canada as a world leader in the creation and use of health knowledge that benefits Canadians and the global community.

ACHIEVING THE MANDATE AND VISION

CIHR promotes a solutions-focused, multidisciplinary and collaborative approach to health research that is underpinned by high ethical standards. Its unique structure comprising 13 virtual Institutes brings together researchers and knowledge usersⁱ from across disciplines, professions, sectors and geographic borders. CIHR currently supports the health research and knowledge translation activities of over 13,700 health researchers and trainees in universities, teaching hospitals and other health organizations and research centres across the country. Investment decisions are guided by a rigorous and transparent peer review process that selects for and meets the highest international standards of excellence.

CIHR INSTITUTES

CIHR's 13 Institutes share responsibility for achieving the objectives of CIHR through strategic plans that are aligned with the overarching directions, mandate and vision of CIHR. The Institutes promote and build upon Canada's research excellence, engage the research community and encourage multidisciplinary, integrative health research and knowledge translation. Through their Scientific Directors and Institute Advisory Boards, the Institutes work with stakeholders across disciplines, professions, sectors and geographic borders to meet health and health system needs and capture emerging national and international scientific opportunities.

- CIHR Institute of Aboriginal Peoples' Health
- CIHR Institute of Aging
- CIHR Institute of Cancer Research
- CIHR Institute of Circulatory and Respiratory Health
- CIHR Institute of Gender and Health
- CIHR Institute of Genetics
- CIHR Institute of Health Services and Policy Research
- CIHR Institute of Human Development, Child and Youth Health
- CIHR Institute of Infection and Immunity
- CIHR Institute of Musculoskeletal Health and Arthritis
- CIHR Institute of Neurosciences, Mental Health and Addiction
- CIHR Institute of Nutrition, Metabolism and Diabetes
- CIHR Institute of Population and Public Health

ⁱ CIHR defines a knowledge user as an individual who is likely to use knowledge generated from research to make informed decisions about health research, health policies, programs and/or practices. A knowledge user can be, but is not limited to, a researcher, research trainee, health practitioner, policy maker, educator, decision maker, health care administrator, community leader, or individual in a health charity, patient group, private sector organization, or media outlet.

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EXECUTIVE SUMMARY



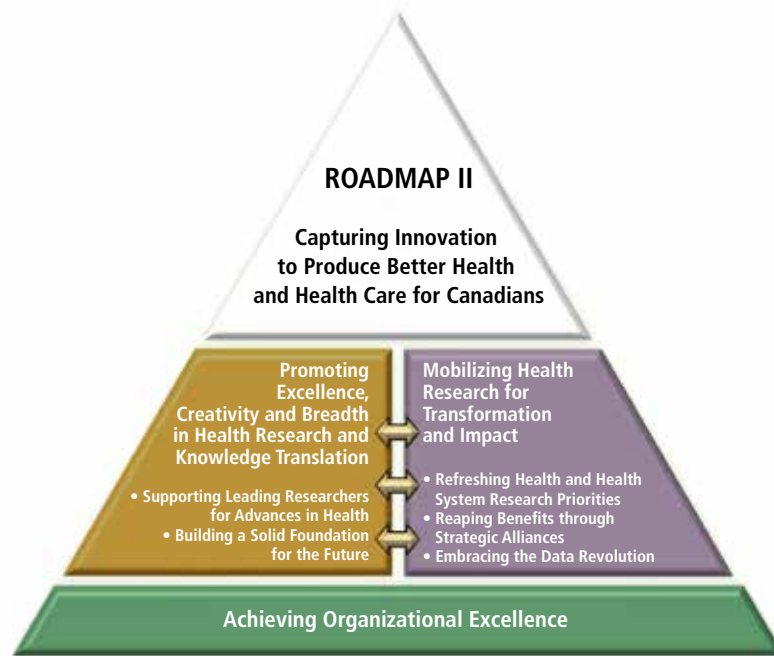


Figure i. Overview of CIHR’s three strategic directions.

A revolution is underway in Canada’s health research landscape. The speed of discovery, convergence of disparate research fields and evolving health needs of Canadians are creating a number of significant, mutually reinforcing trends that are changing the way health research and knowledge translation are being conducted.

Health Research Roadmap: Creating innovative research for better health and health care (2009) was a transformational plan for CIHR that focused on capturing Canada’s health research strengths. Work remains, and we are in a strong position to build on our achievements. *Health Research Roadmap II: Capturing Innovation to Produce Better Health and Health Care for Canadians (Roadmap II)* strikes a balance between **completing** the transformational goals of *Roadmap* (2009) and **aligning** to the future. It continues CIHR’s vision to capture excellence and accelerate health innovation via three strategic directions (Figure i).

Strategic Direction 1 focuses on **promoting excellence, creativity and breadth** in health research and knowledge translation. It is our intent to break down barriers to create an enabling environment that will support world-class researchers in their pursuit of innovative

ideas and approaches, from **discovery to application**. Success demands that we achieve a broader disciplinary mix of researchers across the spectrum of health and foster a robust culture of **excellence in knowledge creation and knowledge translation**. This will be achieved through the implementation of the new **Open Funding Schemes and peer review processes** and the consideration of diverse and evolving ethical, legal and socio-cultural issues in health research, health policy and practice.

Creating opportunities to train the next generation of researchers and professionals, through programs like the **Vanier Canada Graduate Scholarships** program and the **Banting Postdoctoral Fellowships** program, is also a priority for CIHR. We are committed to working with diverse stakeholders so that trainees have the research and professional skills they need to succeed in diverse roles across the health research enterprise.

Strategic Direction 2 focuses on **mobilizing health research for transformation and impact**. It is our intent to build, shape and mobilize research capacity to address critical health issues that are important to **patients**

<p>RESEARCH PRIORITY A: <i>Enhanced patient experiences and outcomes through health innovation</i></p>	<p>This research priority focuses on accelerating the discovery, development, evaluation and integration of health innovations into practice so that patients receive the right treatments at the right time.</p>
<p>RESEARCH PRIORITY B: <i>Health and wellness for Aboriginal peoples</i></p>	<p>This research priority focuses on supporting the health and wellness goals of Aboriginal peoples through shared research leadership and the establishment of culturally sensitive policies and interventions.</p>
<p>RESEARCH PRIORITY C: <i>A healthier future through preventive action</i></p>	<p>This research priority focuses on a proactive approach to understanding and addressing the causes of ill health, and on supporting physical and mental wellness at the individual, population and system levels.</p>
<p>RESEARCH PRIORITY D: <i>Improved quality of life for persons living with chronic conditions</i></p>	<p>This research priority focuses on understanding multiple, co-existing chronic conditions, and on supporting integrated solutions that enable Canadians to continue to participate actively in society.</p>

Figure ii. CIHR’s health and health system research priorities for 2014–15 to 2018–19.

and Canadians, and to maximize health, social and economic impacts through targeted and partnered investments. CIHR will achieve this through a number of **Institute-led and signature initiatives**, and by working with Canadians to ensure a **patient-oriented approach** that improves both practice and treatment.

CIHR’s refreshed health and health system research priorities are designed to provide strategic attention to important areas identified by CIHR’s researcher and stakeholder communities (Figure ii).

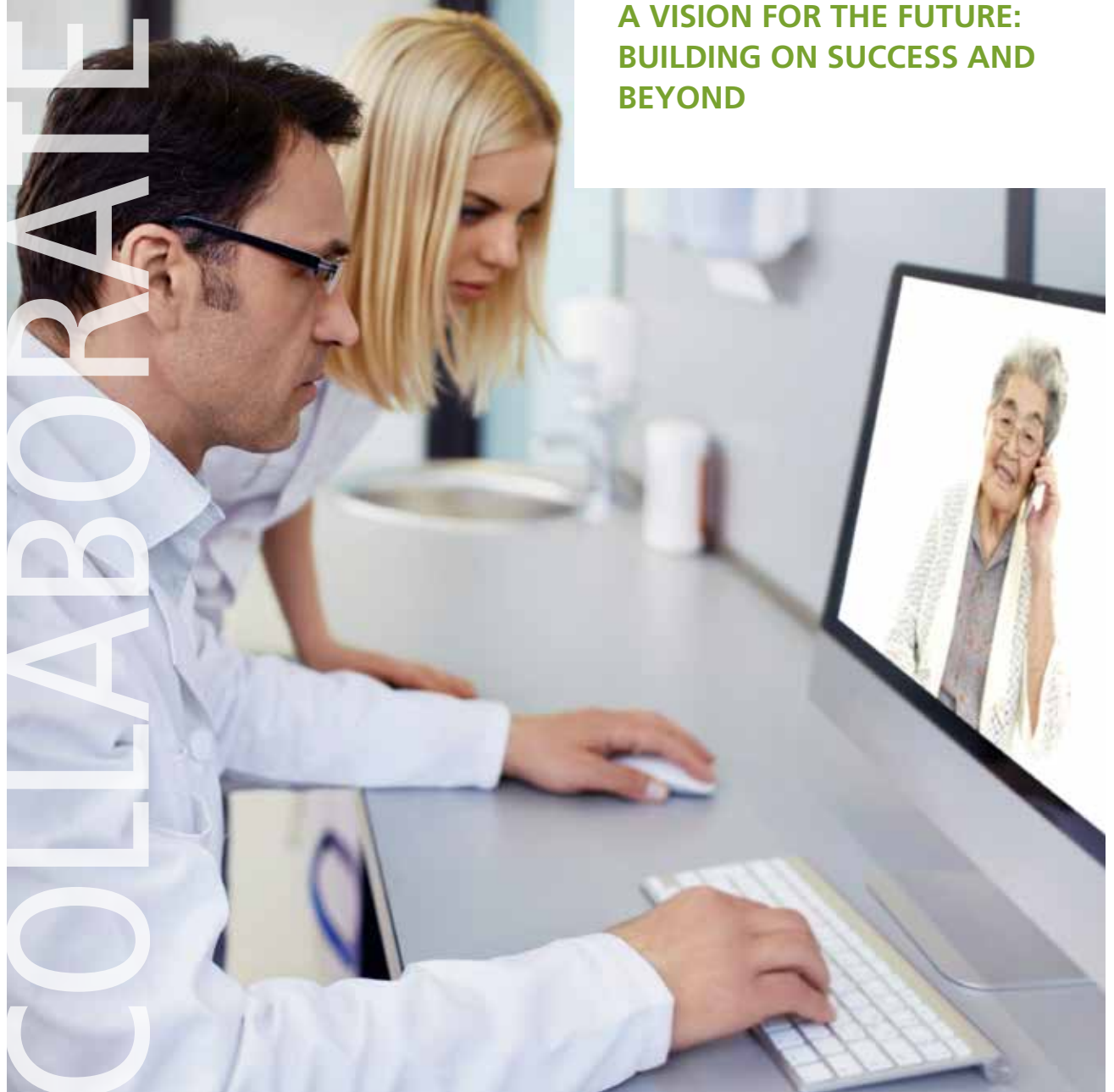
Addressing these research priorities demands strategic alliances that transcend traditional boundaries. Aligning to the future requires CIHR to expand its international perspective, embrace the data revolution, seize the momentum of eHealth, and build an entrepreneurial advantage.

Strategic Direction 3 focuses on **enhancing and optimizing** CIHR’s activities and resources to align the organization with emerging and future needs. It is our intent to support a culture of continuous improvement

and to demonstrate a return on investment for Canadians through transparent and accountable programs, processes and decisions, responsible governance and stewardship, and a modern, world-class work environment.

Delivering on a national health research agenda requires contributions from all members of the Canadian health research enterprise. Together, we will encourage innovation, adopt evidence-informed practices, contribute to higher education and training, facilitate commercialization, and champion the social and economic value of effective health care systems and a healthy population. These will be underpinned by an ongoing commitment to research integrity and the consideration of ethical, legal and social issues that make success possible.

We look forward to working with all members of Canada’s health research enterprise to create a sustainable future that is responsive to change and geared towards transformation and impact in health.



**A VISION FOR THE FUTURE:
BUILDING ON SUCCESS AND
BEYOND**

Health research plays an important role not only in improving health outcomes for Canadians and people around the world, but also in contributing to the overall societal and economic prosperity of Canada.¹ It advances our fundamental understanding of the complex factors that influence our health and opens the door to innovative solutions that can affect our health, social and economic well-being.

Inspiring Action, Catalyzing Change – CIHR plays an important role in driving innovation. Addressing Canada’s most complex health challenges will require contributions from all members of the Canadian health research enterprise.

CIHR operates at the forefront of health research breakthroughs. As the major federal funder of health research in Canada, we are well positioned to attract, capture and support innovative ideas with the greatest potential for important advances in knowledge and in health. Our unique structure is designed to break down barriers that impede innovation and serves to bring researchers and knowledge users together from across disciplines, professions, sectors and geographic borders to find solutions to Canada’s most complex health challenges.

While CIHR plays an important role in driving innovation for improved health and health system outcomes, we cannot do it alone. The success of CIHR’s investments requires contributions from all members of the Canadian health research enterprise (Figure 1) to encourage innovation, facilitate commercialization, adopt evidence-informed practices, contribute to higher education and training, and champion the economic and social value of effective health care systems and a healthy population.



Figure 1. Canada’s Health Research Enterprise: Delivering the benefits of health research to Canadians. Researchers are found in all of these groups.



A CHANGING CANADIAN HEALTH RESEARCH LANDSCAPE

The speed of discovery, convergence of disparate research fields and evolving health needs of Canadians are creating a revolution in Canada's health research landscape. This revolution is characterized by a number of significant, mutually reinforcing trends:

A culture of collaboration. There is a paradigm shift underway in the way health research is conducted. Emerging research opportunities and complex health challenges are driving researchers to explore new frontiers and ways of working.² Multidisciplinary networks of collaborators and the integration of diverse perspectives are increasingly necessary to advance the boundaries of health knowledge.

A technology and data revolution. Information and communications technologies are transforming health research and health care. There is growing interest in eHealth to enable an interactive, personalized health care experience.³ An opportunity exists for health researchers and their collaborative stakeholders to harness the power of technology and data not only to tackle new scientific challenges but also to improve timely and equitable access to health services.⁴

Capitalizing on Emerging Trends – A revolution is underway in Canada's health research landscape. Recognizing and adapting to significant trends will enable us to strengthen the long-term sustainability of our contributions.

Rising expectations. As the pace of change accelerates, so do expectations about the benefits of health research.⁵ Canadians are looking for more information and options to better manage their own health, and they want to take an active role in informing and designing solutions that will provide them with greater access to information, personalized treatment regimens and improved health systems.⁶

Balancing multiple interests. Exploiting the opportunities provided by scientific discovery and innovation will require difficult decisions that balance the multiple, and sometimes competing, interests and motivations of researchers, research participants, research sponsors, academic institutions, health system leaders, individuals and society.⁷ A structured, analytical and deliberate approach to responsible decision making is needed to ensure that these multiple interests are considered.

Recognizing and adapting to these trends will strengthen the long-term sustainability of our contributions to the Canadian health research enterprise.

ALIGNING TO THE FUTURE

Capturing research excellence in an ever-changing environment has meant adapting to new ways of working. CIHR's second strategic plan, *Health Research Roadmap: Creating innovative research for better health and health care* (2009), was a transformational plan for CIHR and provided a strong vision for the Canadian health research enterprise. Over the past five years, we took steps to modernize our existing programs, policies and systems to better capitalize on Canada's health research strengths and to better capture the evolution in health research and the health research landscape. Despite a period of slower economic growth, a number of transformational initiatives were introduced, including the reforms to our Open Suite of Programs and peer review processes, the Strategy for Patient-Oriented Research (SPOR), and the signature initiatives.

Changing the Game – *Roadmap II* continues CIHR's vision to capture excellence and accelerate health innovation in Canada. It reflects the synergy between promoting excellence, creativity and breadth in health research, and mobilizing health research for transformation and impact.

Health Research Roadmap II: Capturing Innovation to Produce Better Health and Health Care for Canadians (the third and current strategic plan) continues CIHR's vision to capture excellence and accelerate health innovation in Canada. It underscores the importance of working with others to enable transformative change and reflects the synergy between promoting excellence, creativity and breadth in health research, and mobilizing health research for transformation and impact.

We are in a strong position to build on our achievements and complete the transformation we began five years ago. We must continue to modernize our programs, policies and systems to support an environment where innovation can succeed and where new ideas can be efficiently and effectively translated into benefits for Canadians and others.



Roadmap II establishes three strategic directions that will guide our efforts and investments to advance knowledge and capture innovation for better health and health care.

Strategic Direction 1 focuses on promoting excellence, creativity and breadth in health research and knowledge translation through CIHR's investigator-initiated funding strategy. It is our intent to break down barriers to innovation and create an environment that will support world-class researchers in their pursuit of innovative ideas and approaches, capture results, and provide opportunities to train the next generation of researchers and professionals.

Strategic Direction 2 focuses on mobilizing health research for transformation and impact through CIHR's priority-driven funding strategy. It is our intent to build, shape and mobilize research capacity to address critical health issues and maximize the health, social and economic impacts of health research through targeted and partnered investments.

Strategic Direction 3 focuses on enhancing and optimizing CIHR's activities and resources to align the organization with emerging and future needs. It is our intent to support a culture of continuous improvement and to demonstrate a return on investment for Canadians.

A performance measurement framework for *Roadmap II* has been established to report on the progress made towards implementing this plan over the next five years (**Annex A**). This framework is part of a much larger performance measurement strategy for CIHR and is based on the Canadian Academy of Health Sciences research outcomes framework, as well as on other accountability and Parliamentary reporting requirements stipulated by the Government of Canada.

**STRATEGIC DIRECTION 1
PROMOTING EXCELLENCE, CREATIVITY
AND BREADTH IN HEALTH RESEARCH
AND KNOWLEDGE TRANSLATION**



Investigator-initiated health research plays an important role in feeding the innovation pipeline with the very best ideas, from discovery to application. It provides a greater understanding of the factors that influence our health and can lead to groundbreaking discoveries with the potential for important health, social and economic impacts. CIHR recognizes the importance of maintaining a robust supply of world-class health researchers and trainees and is committed to increasing support for the pursuit of innovative ideas and approaches in all areas of health research and knowledge translation.

This section focuses on our continuing efforts to implement a flexible and sustainable system capable of supporting leading-edge health research and researchers now and in the future.

1.1 SUPPORTING LEADING RESEARCHERS AND IMPORTANT ADVANCES IN HEALTH

Over the past several years, we worked to modernize our programs, policies and systems to better capitalize on Canada's health research strengths and to adapt to the evolution within the health research landscape. A bold approach was taken to design a high-quality, flexible and sustainable system capable of identifying and supporting excellence in all areas of health research.⁸ We are now in the process of transitioning from the existing Open Suite of Programs into the new Open Funding Schemes.

The new Open Funding Schemes are designed to meet the needs of a broader disciplinary mix of researchers within CIHR's mandate. The Foundation and Project Schemes represent complementary approaches for promoting creativity, driving innovation and capturing groundbreaking health research in diverse and emerging fields.

Enabling Researchers to Succeed – It is our intent to create an enabling environment that will support world-class researchers in their pursuit of innovative ideas and approaches, from discovery to application. Success demands a robust culture of excellence in both knowledge creation and knowledge translation.

- The **Foundation Scheme** is designed to provide long-term support to research leaders at any career stage with demonstrated track records of success, including new/early career investigators with excellent training and early-career productivity, to pursue innovative and high-impact programs of health research.
- The **Project Scheme** is designed to capture ideas with the greatest potential for important advances in health-related knowledge, health care, health systems and/or health outcomes, by supporting projects brought forward by researchers and knowledge users for a specific purpose with a defined end point.

We will also implement changes to our expert peer review process to ensure that it supports the selection of the most innovative and cutting-edge proposals for research and/or knowledge translation, while continuing to be fair, well-managed and transparent. Through the implementation of the **College of Reviewers**, we will be better positioned to recruit, train, recognize and support a wide variety of experts to meet our diverse peer review needs (Figure 2).

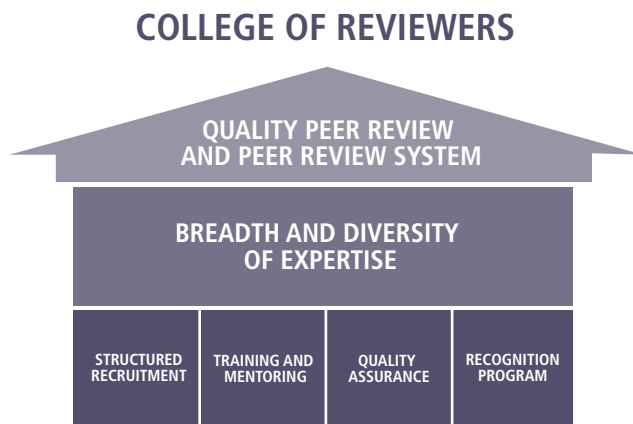
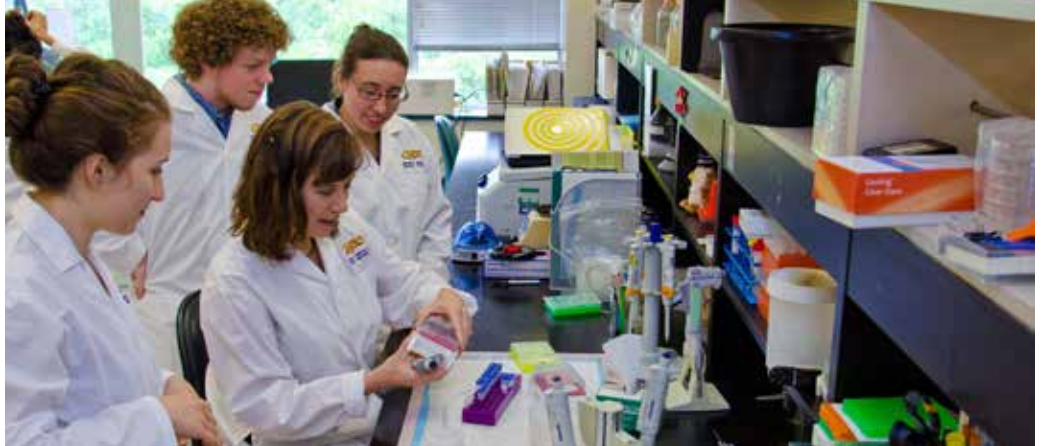


Figure 2. Key components of the College of Reviewers.

CIHR’s mandate emphasizes the importance of capturing excellence in health research, in both knowledge creation and its translation into real-world solutions, from improved health services and products to a strengthened health care system. New Open Funding Schemes that foster not only a robust culture of excellence in creating new knowledge, but also a culture of excellence in knowledge translation, are essential for accelerating transformative changes in health and the health system. We will promote an integrated approach to knowledge translation that encourages the participation of relevant stakeholders at appropriate stages of the research process. We will also continue to support research that advances the understanding and practice of knowledge translation.

Ensuring progress in an evolving health research landscape also requires enhancing the consideration of ethical, legal and socio-cultural issues in health research, health policy and health practice. We will encourage the exploration of diverse ethical issues in the new Open Funding Schemes and will foster research and knowledge translation practices of the highest standards of ethics and integrity.

Over the next five years, CIHR will continue to transition from our current systems to the new Open Funding Schemes and peer review processes. We will conduct various pilot studies and tests to validate the new design elements and inform any course corrections that may be needed. As leaders of change, we are committed to monitoring the outcomes and sharing what we learn with researchers, stakeholders and other research funding organizations.



Laboratory of Dr. Kym Boycott, Children's Hospital of Eastern Ontario.

1.2 BUILDING A SOLID FOUNDATION FOR THE FUTURE

Supporting knowledge creation and its successful translation into benefits for society requires a diverse, highly qualified work force. The next generation must develop an appropriate set of research and professional skills that will allow them to adapt to changes in the health research landscape and contribute to diverse roles in the Canadian health research enterprise.⁹ The increasing complexity of research questions, and importance of collaboration and knowledge translation, have created a need to expose trainees to diverse expertise and environments.¹⁰

Collective action is needed to maximize Canada's approach to training and mentoring, so as to provide students and trainees with the right mix of experience and skills to succeed in the health-related academic and/or professional careers of the future. CIHR has a role in strengthening mentorship and professional skills development through defined expectations within our funding program requirements and peer review criteria. We will encourage leading researchers to establish innovative training environments that prepare trainees for evolving research and research-related careers at home and abroad. We are also committed to working with diverse stakeholders to develop a national vision that will position trainees for success within a global health research enterprise.

Positioning Trainees for Success – A key CIHR priority is to enable the success of next-generation researchers and professionals, through programs such as the Vanier Canada Graduate Scholarships program and the Banting Postdoctoral Fellowships program.

STRATEGIC DIRECTION 2 MOBILIZING HEALTH RESEARCH FOR TRANSFORMATION AND IMPACT





CIHR has a responsibility to actively build, shape and mobilize Canada's research capacity to address critical health issues and opportunities championed by Canadians. A targeted approach complements investigator-initiated research by ensuring that a portion of CIHR's investments is deliberately directed towards health and health system research priorities that reflect the evolving health needs and expectations of Canadians and capture emerging national and international scientific opportunities.

CIHR leads the development and implementation of targeted and partnered initiatives that respond to specific health challenges. These initiatives, which include Institute-led, signature initiatives and other priority-driven initiatives, aim to maximize the collective efforts of the many players in the Canadian health research enterprise to mobilize resources and reap the benefits of joint investments in health.

This section focuses both on refreshing CIHR's health and health system research priorities to meet the needs of the future and on strengthening strategic alliances to reap the benefits of health research.

2.1 REFRESHING HEALTH AND HEALTH SYSTEM RESEARCH PRIORITIES

Over the past year, CIHR undertook a scan of the national and international health and health research landscape and engaged researchers, governments, funding agencies,

voluntary health organizations, professional associations, patients, private sector organizations and other key stakeholders in a discussion of current and emerging trends in health and health research.

CIHR's refreshed research priorities build upon the success of *Roadmap* (2009) and inform a national health research agenda that warrants strategic attention by CIHR's researcher and stakeholder communities. Over the next five years, CIHR will invest in research for innovation in health care and health systems for improved patient outcomes, for health and wellness for Aboriginal peoples, for health promotion and disease prevention, and for the management and treatment of chronic conditions. The transformative nature of these refreshed priorities will require CIHR and our research community to embrace new approaches, platforms, partners and participants to accelerate the delivery of research results and achieve health, social and economic impacts for Canadians.

We must be mindful of new ethical, legal and social issues that the development of targeted and partnered initiatives may engender. The transformative goals of our targeted investments, and new ways of working, may warrant special attention to address competing priorities in research and in research policy. We will continue to act upon our responsibility to uphold research integrity and promote ethical, legal and social advances in this changing environment.

Research Priority A. Enhanced patient experiences and outcomes through health innovation

There are rising expectations that research will realize new and improved medical technologies and health care delivery models to enhance patient experiences and health outcomes.^{11, 12} Evidence-informed health innovations have the potential to enable a

personalized care experience by connecting providers, patients and medical information, and by ensuring the right patient receives the right treatment at the right time. CIHR is in a unique position to mobilize all members of the Canadian health research enterprise to accelerate the discovery, development, evaluation and integration of health innovations into practice. Success depends upon an approach that fosters the integration of research into clinical and other health system settings; enables commercialization; assesses the quality, safety and effectiveness of innovations; and considers the long-term sustainability of the health care system.

The diagram below outlines the focus of Research Priority A and includes examples of relevant research areas and knowledge translation activities (Figure 3). Information on ongoing and emerging Signature and other Strategic Initiatives related to Research Priority A can be found in Annex B.



Figure 3. Examples of research areas and knowledge translation activities for Research Priority A: Enhanced patient experiences and outcomes through health innovation.

Research Priority B. Health and wellness for Aboriginal peoples

Strategic attention is required to address the ongoing, long-standing gap in health status between Aboriginal and non-Aboriginal peoples in Canada.¹³ An opportunity exists for CIHR to support the health and wellness goals of Aboriginal peoples through research on culturally sensitive health and social policies and interventions. Success requires the meaningful engagement of Aboriginal peoples in research leadership and throughout the research process; the inclusion of Indigenous approaches in the design, implementation

and evaluation of policies and interventions; the scale-up of effective approaches; and the coordinated efforts of health and non-health partners in remote, rural and urban communities. It is expected that knowledge gained from researching and establishing responsive programs, tools and services will be shared and applied to reduce health inequities.

The diagram below outlines the focus of Research Priority B and includes examples of relevant research areas and knowledge translation activities (Figure 4). Information on ongoing and emerging Signature and other Strategic Initiatives related to Research Priority B can be found in Annex B.

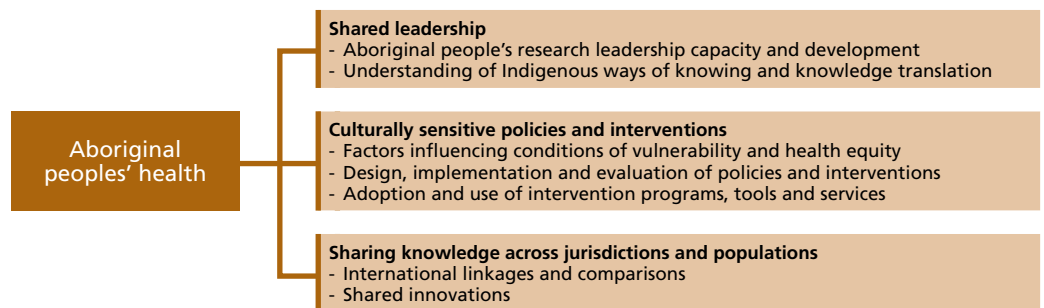


Figure 4. Examples of research areas and knowledge translation activities for Research Priority B: Health and wellness for Aboriginal peoples.

Research Priority C. Promoting a healthier future through preventive action

While access to health care is key to maintaining good health, many other social, cultural and environmental factors, including exposure to physical and social environments and global threats, have a major impact on health outcomes.¹⁴ A proactive approach to understanding and addressing the causes of ill health, and supporting physical and mental wellness at the individual, population and system levels, is needed to promote a healthier future for Canadians across the life course.¹⁴ Support for evidence-informed population

health strategies will include research on the factors that determine health and disease, and on policies, interventions, tools and approaches that promote the conditions for health.

The diagram below outlines the focus of Research Priority C and includes examples of relevant research areas and knowledge translation activities (Figure 5). Information on ongoing and emerging Signature and other Strategic Initiatives related to Research Priority C can be found in Annex B.

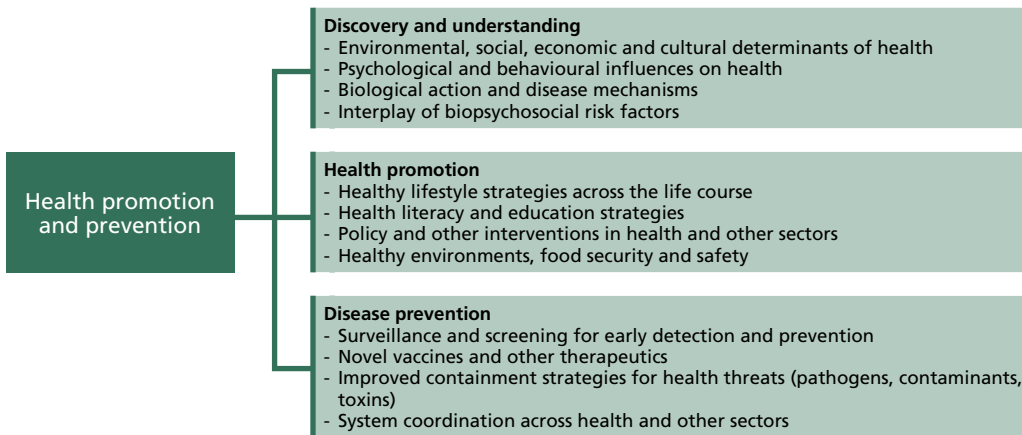


Figure 5. Examples of research areas and knowledge translation activities for Research Priority C: Promoting a healthier future through preventive action.

Research Priority D. Improved quality of life for persons living with chronic conditions

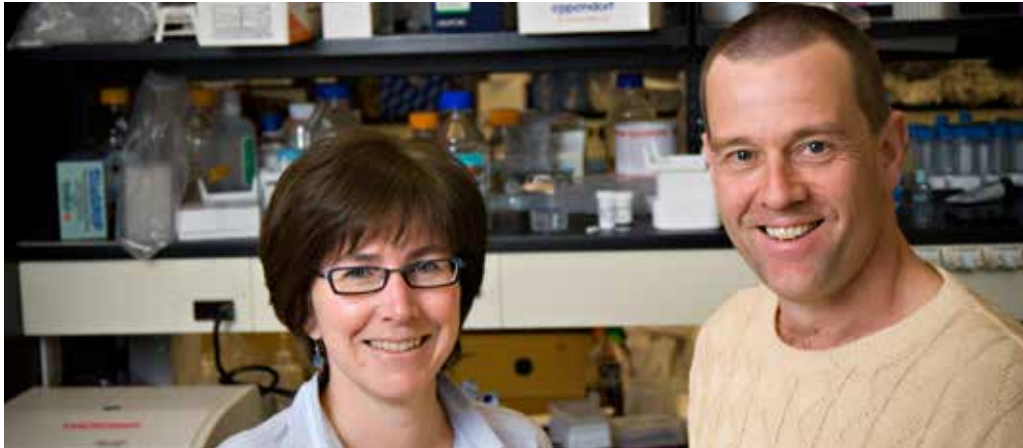
The number of Canadians experiencing reduced quality of life due to chronic disease, mental illness or disability is growing.¹⁵ These conditions have long-term consequences and can have an effect on an individual’s well-being, social life, family life and employment.¹⁶ CIHR will support research that enables Canadians to better understand and manage multiple, co-existing chronic conditions and continue to participate actively in society. Success will require multidisciplinary and intersectoral collaborations to support

an advanced understanding of the pathophysiology, diagnosis and treatment of co-existing chronic conditions, of integrated health care models, and of self-management and social support strategies. An opportunity exists to exploit the use of technology and create supportive environments that enhance autonomy at work and at home.

The diagram below outlines the focus of Research Priority D and includes examples of relevant research areas and knowledge translation activities (Figure 6). Information on ongoing and emerging Signature and other Strategic Initiatives related to Research Priority D can be found in Annex B.



Figure 6. Examples of research areas and knowledge translation activities for Research Priority D: Improved quality of life for persons living with chronic conditions.



Structural Genomics Consortium (Toronto) Chief Scientist, Dr. Cheryl H. Arrowsmith, and Structural Genomics Consortium Director, Dr. Aled Edwards. The SGC is a not-for-profit public-private partnership involving nine companies and government research funding agencies in Canada and the United Kingdom.

2.2 REAPING BENEFITS THROUGH STRATEGIC ALLIANCES

CIHR's health and health system research priorities are complex and cannot be addressed by CIHR alone. Responding to these priorities will require a highly networked approach that reaches beyond health researchers to include other stakeholders and knowledge users. The design, development, implementation and evaluation of innovative health solutions will require forging strategic alliances that transcend the traditional boundaries associated with research institutions, sectors, disciplines and geopolitical borders. Pooling resources and taking collective action on a number of complex challenges will position the health research enterprise for accelerated and long-term success.

WORKING WITH CANADIANS

CIHR is taking action to promote the meaningful engagement of Canadians in governance, research and knowledge translation. Through our citizen and patient engagement strategies, CIHR will embed the perspectives of citizens, patients and caregivers into priority setting, policies, programs and business transformation initiatives, as well as support the integration of relevant stakeholders in the research process to accelerate changes in health policy and practice.

BUILDING AND REINFORCING STRATEGIC ALLIANCES

Mobilizing capacity across the Canadian health research enterprise towards transformation and impact will depend on CIHR's ability to maximize our networks and tap into the expertise of new health and non-health sector partners who share a common, health-oriented goal. We are committed to working with new and existing partners from various disciplines, professions and sectors to leverage collective expertise and contributions; co-design new strategies, tools and platforms; and foster innovative health solutions. Through shared leadership and governance on research and research policy initiatives, CIHR and our partners can establish effective, multi-dimensional solutions to address health and health research challenges that affect Canadians and the global community.

ENGAGING WITH THE INTERNATIONAL COMMUNITY

CIHR has a responsibility to enable Canada's researchers to seize international opportunities, promote Canadian research excellence and leadership, and contribute to cutting-edge health research that tackles the broad, complex and interconnected health

issues experienced by Canadians and people around the world. The strength of CIHR's international engagements is rooted in our flexible and collaborative approach, which allows us to engage where and when emerging opportunities align with national and international priorities.

Expanding our Network for Innovation –

Responding to the health needs of Canadians will require a highly networked approach that reaches beyond Canada's community of health researchers and transcends traditional ways of working.

CIHR will continue to seek international networking opportunities to build on previous successes and to encourage new international partnerships that position Canadian researchers as leaders and innovators in both key international research initiatives and global health care system improvements. We will broker opportunities for Canadian researchers to gain access to leading expertise, facilities and technologies, as well as unique populations and environments. We will continue to promote a culture of collaboration in the international research environment and contribute to the improved quality, timeliness and impact of health research worldwide.

EXPANDING OUR GLOBAL PERSPECTIVE

The significant health and health system challenges faced by low- and middle-income countries have long been recognized as critical to address.¹⁷ CIHR will support collaborations between Canadian researchers and researchers from low- and middle-income countries to help build an evidence base that will inform health-related policies, programs and strategies, and enable a better response to both common and unique health challenges. We will promote implementation research to examine what works, for whom, under what circumstances, and how interventions can be adapted and scaled up in ways that are accessible and equitable to low- and middle-income country populations. Engaging in these collaborative initiatives will provide Canada with an opportunity to learn from the ingenuity of low- and middle-income countries. It is our intent to mobilize the knowledge garnered from innovative global health solutions to inform solutions in Canada.

Bringing Global Solutions Home – We will mobilize the knowledge garnered from global health collaborations and innovative global health initiatives to inform solutions in Canada.

2.3 BUILDING AN ENTREPRENEURIAL ADVANTAGE

Health research plays an important role in contributing to a healthier, more productive society. While Canada is internationally recognized for its strength in generating health knowledge, it faces challenges in mobilizing this knowledge into health products, services and processes that can improve the quality of life of Canadians and positively contribute to Canada's economic well-being. Addressing this challenge will require the collective efforts of academic institutions, private sector partners, federal and provincial departments and agencies, researchers, clinicians, patients and others to define a coordinated approach that supports business innovation and the commercialization of research breakthroughs.²⁰

We will focus on leveraging successful commercialization networks and hubs, forging alliances and creating pre-competitive consortia with new industry partners, and supporting public-private partnerships and collaborations. CIHR intends to remain responsive to the needs of Canada's commercialization ecosystem, and refresh our strategies to move health knowledge along the innovation pipeline and into health and economic benefits for Canadians.



2.4 EMBRACING THE DATA REVOLUTION

A data revolution is underway in every sector and economy. Recent advances in technology, as well as an increased participation in digital culture, have resulted in an ever-increasing volume and flow of data from a variety of sources.¹⁸ Organizations around the world are now focused on harnessing the power of “big data”ⁱⁱ to expand research opportunities and provide evidence-informed insights to acquire new knowledge and guide decision making. Canada’s emerging open science strategy is intended to contribute to the data revolution by increasing access to public sector data and information.

ADVANCING DATA-INTENSIVE RESEARCH

An opportunity exists to take advantage of large pools of scientific, health system, enterprise, multimedia and social media data to discern patterns and address increasingly complex health research questions and health system challenges. However, the lack of expertise, efficient tools and methodologies available to effectively access, mine, link and analyze vast quantities of data presents a major challenge. CIHR has a role in creating policies that support high-quality data-intensive research, and that maximize opportunities for big data to advance knowledge and inform decisions that improve health, social and economic outcomes. It is our intent to collaborate with other agencies to advance an intersectoral, multi-pronged approach that considers infrastructure and capacity needs, and to adopt policies for improved data quality, access, sharing and stewardship.

ⁱⁱ “Big data” refers to data whose size and complexity is beyond the ability of typical software tools and human capacity to manage and process in an informative way (adapted from Manyika, J. *et al.*, 2011).

SEIZING THE MOMENTUM ON TRANSFORMATIVE IMPACTS IN eHEALTH

The transformative power of information and communication technologies is increasingly at the forefront of health research and health system discussions. A number of eHealth technologies are emerging, fueled by growing societal expectations for anytime, anywhere health care.

eHealth innovations are producing a wealth of data, which is creating a whole new wave of research and health care possibilities. However, there is little information available about their quality, safety and effectiveness.¹⁹

Unleashing Information – CIHR must promote a culture that will harness the power of “big data” and address increasingly complex health research questions and challenges.

An opportunity exists for CIHR to seize the momentum and contribute to innovative, evidence-informed eHealth solutions that will improve patient experiences, health outcomes and the sustainability of the health care system (Figure 7).

	Innovations that ...	Improve ...	Examples ...	
Research for evidence-based development, evaluation and integration of eHealth innovations	eHealth for enhanced patient experiences and outcomes	Connect providers, patients and disparate sources of data and information	Diagnostic accuracy; treatment appropriateness; accountability of care	<ul style="list-style-type: none"> - E-records - Gene banks - E-diagnosis - E-decision support
	eHealth for health and wellness in Aboriginal peoples	Include citizen-informed, culturally sensitive, population-specific design and content	Access to health care across social, geographical or cultural contexts	<ul style="list-style-type: none"> - E-learning - E-community - Telemedicine - Remote technologies
	eHealth for a healthier future through preventive action	Provide analytical and predictive modelling using data integrated across systems	Evidence-informed preventive action at the individual, system and population levels	<ul style="list-style-type: none"> - My-health - Surveillance platforms - E-detection - eHealth map
	eHealth for enhanced quality of life for persons living with chronic conditions	Enable access to personal health information, support networks and care providers	Citizen empowerment in health maintenance and autonomy at home and at work	<ul style="list-style-type: none"> - E-biometrics - E-network - Smart home/office - E-wear/clothing

Figure 7. Incorporation of eHealth across the four research priority areas.

**STRATEGIC DIRECTION 3
ACHIEVING ORGANIZATIONAL
EXCELLENCE**





CIHR's pledge to achieve organizational excellence is rooted in our firm commitment to continuous improvement. As a steward of public funds, CIHR has an obligation to maintain the public's trust and confidence, and demonstrate good value for money. This means ensuring that Canadians understand how and why decisions are made, demonstrating the value and impact of our investments, and optimizing the use of resources.

Efforts are underway to modernize our existing programs, policies and systems to better capitalize on Canada's health research strengths and address solutions to health challenges championed by Canadians. CIHR must align the organization to efficiently and effectively design, invest and manage for impact. Over the next five years, our efforts will focus on priority projects to enhance transparency and accountability, ensure responsible governance and stewardship, and build a modern, world-class work environment.

ENHANCING TRANSPARENCY AND ACCOUNTABILITY

CIHR has an obligation to report, explain and be answerable to Canadians about our investment decisions and outcomes. A continuous and measured approach to evaluating success and auditing controls is needed to confirm CIHR's return on investment. Establishing an integrated approach to corporate performance measurement will allow CIHR to demonstrate the efficiency and integrity of our operations, the effectiveness of our programs and the impact of our investments. We will also engage in an assessment of our business model to ensure our Institutes remain responsive to emerging health challenges and scientific opportunities.

ENSURING RESPONSIBLE GOVERNANCE AND STEWARDSHIP

CIHR must be diligent in balancing our priorities to ensure the long-term sustainability of our contributions to the Canadian health research enterprise. It is our intent to strengthen our financial management practices through the implementation of a 10-year investment plan and oversight process for major investments. We will also continue to consolidate, harmonize and align programs across Federal funding agencies, where appropriate, to support cross-cutting, multidisciplinary research initiatives, and address important opportunities for research convergence.

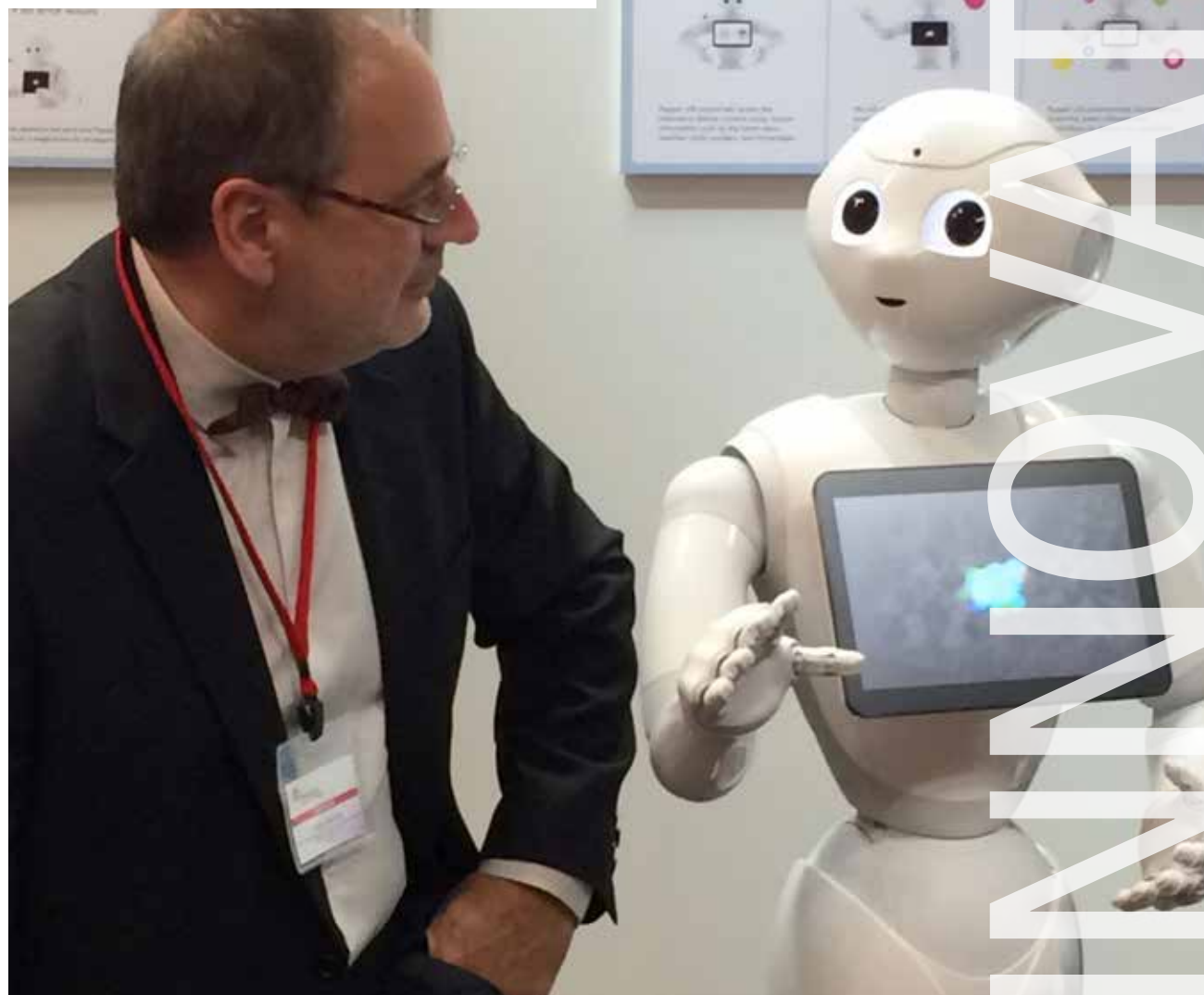
Strengthening the integrity of CIHR's business activities and decisions demands an integrated approach that systematically embeds the consideration of ethical principles into CIHR's priority setting, policies, programs, processes and partnerships. It is our intent to enhance our leadership and accountability model, ensure proper implementation and oversight of our legislated ethics mandate and maintain the public's confidence and trust.

CIHR relies heavily on both objective evidence and informed opinions to guide our decisions and make the right investments in health research. We remain committed to engaging Canadians in the development of transformational initiatives and to including diverse advisors on our decision making bodies. Over the next five years, we will focus on piloting and rigorously evaluating various aspects of our new open programs, processes and other business solutions with researchers and partners. It is our intent to learn from these pilots, contribute to the body of knowledge on funding program design and peer review and inform international standards of excellence.

BUILDING A MODERN, WORLD-CLASS WORK ENVIRONMENT

CIHR's programs, processes and initiatives are supported by a world-class work environment that embraces continuous learning, new technologies and new ways of working. Continuing the transformation CIHR began five years ago demands a modern workplace that mobilizes talent and integrates new business and technology solutions to support the organization and our research community.

THE WAY FORWARD: CAPTURING INNOVATION



Dr. Yves Joannette, Scientific Director of the CIHR Institute of Aging, with Pepper, a care robot, at the Global Action Against Dementia Event in Japan.



Launch of the Newfoundland and Labrador SUPPORT Unit, announced as part of the national Strategy on Patient-Oriented Research.

Canada’s responsibility to deliver on a national health research agenda does not rest with CIHR alone. Enabling the creation of new health knowledge and expediting its translation into innovative health solutions for Canadians demands greater, deeper and stronger collaborations with all members of the health research enterprise.

Driving Innovation Through Collaboration –

Delivering on a national health research agenda will demand greater, deeper and stronger collaborations with all members of the Canadian health research enterprise. We cannot do it alone.

Roadmap and *Roadmap II* were designed to challenge both CIHR and its extended health research community to think about what is needed to support research excellence in a changing world, and to mobilize health knowledge for transformation and impact. For CIHR, it has meant modernizing existing frameworks and systems to provide researchers with the freedom and autonomy to pursue innovative ideas and approaches, and rallying leading researchers to focus their expertise on the health priorities of Canadians.

As CIHR progresses through this period of significant transformation, we must take advantage of our position in the Canadian health research enterprise. As a broker of health knowledge, CIHR is well positioned to become a catalyst for strategic thinking, leadership, networking and action in health research. Aligning to the future will mean embracing new roles to support a high-functioning, networked ecosystem that enables the integration of research evidence to influence Canada’s health, science, economic and social agendas.

It is our intent to foster a nimble environment that supports research excellence, nurtures innovation and responds to the health needs of Canadians. As we direct our efforts towards achieving this vision, we are committed to assessing our progress as we move forward.

We invite all members of the Canadian health research enterprise to join us in creating a sustainable future that is responsive to change and geared towards transformation and impact in health.

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ANNEX A: DEFINING SUCCESS FOR ROADMAP II

CIHR is committed to providing Canadians with a clear overview of the strategies and priorities we will be acting upon. A performance measurement framework for the 2014-15 – 2018-19 strategic plan has been established to report on actual progress made towards implementing this plan over the next five years. This framework is part of a much larger performance measurement strategy for CIHR, and is based on the Canadian Academy of Health Sciences research outcomes framework, and other accountability and Parliamentary reporting requirements stipulated by the Government of Canada (Figure 8).

Roadmap II sets out three strategic directions that guide our efforts and investments in both Investigator-Initiated Health Research and Priority-Driven Health Research to advance knowledge and capture innovation for better health and health care. A number of short-term and medium-term performance indicators have been selected for *Roadmap II* (Table 1). These indicators are aligned to each strategic direction and to the expected outcomes of

our key commitments. Progress on these performance indicators will be reported regularly.

It is our intent to measure the overall success of *Roadmap II*, recognizing that the transformational health, social and economic impacts of our strategic directions can only be realized 10, 15 or 20 years after the strategy has been fully implemented, and will depend on contributions from all members of the Canadian health research enterprise. Evaluations of the initiatives within *Roadmap II*, and an impact study on *Roadmap II* as a whole, will be conducted to measure longer-term progress. These studies will include long-term performance indicators to demonstrate the health, health system, social and economic benefits realized over time. We are committed to publicly sharing performance information through CIHR and other Government of Canada reporting, and to working with stakeholders to reliably capture high-quality performance information for short-, medium- and long-term reporting.

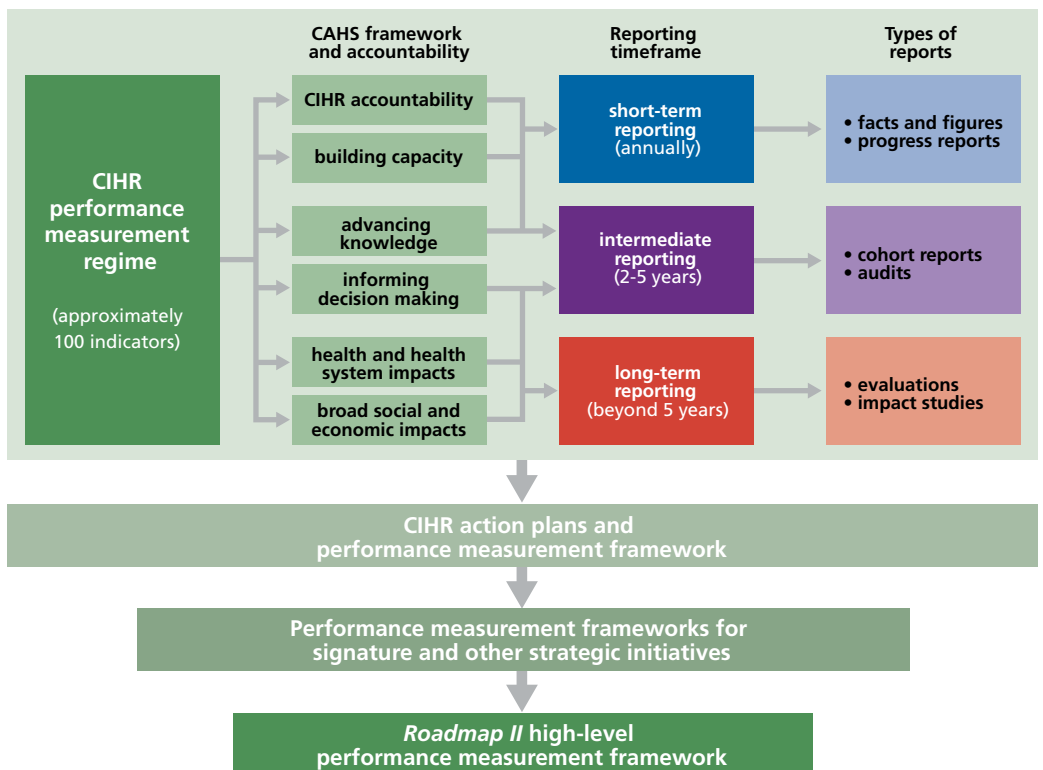


Figure 8. CIHR Performance Measurement Regime and its relationship to *Roadmap II*.

TABLE 1

EXPECTED OUTCOMES AND PERFORMANCE INDICATORS FOR ROADMAP II

CIHR will regularly report on progress made towards expected outcomes using this framework. Note that the framework may evolve as new, reliable sources of information become available.

EXPECTED OUTCOMES		PERFORMANCE INDICATORS								
		% of expenditures ⁱⁱⁱ	no. of grants ⁱⁱⁱ	no. of researchers funded ⁱⁱⁱ	no. of publications ^{iv}	Citation of findings in scientific and non-scientific publications ^{ii,iv}	Field analysis of citations ^{ii,v}	Share of top 5% cited papers acknowledging CIHR	Average relative citations (ARC) ⁱⁱⁱ	
To promote excellence, creativity and breadth in health research; and, mobilize health research for transformation and impact										
Strategic Direction 1	Diverse health-related projects and programs of research advance knowledge and/or improve health care, health systems, health or economic outcomes	●	●		●	●	●	●	●	
	Diverse research leaders across the spectrum of health			●		●	●			
	Integration of stakeholders ^{vi} into the research process									
	A base of well-trained reviewers that represent diverse expertise, experiences and perspectives									
	Trainees are leaders in the Canadian Health Research Enterprise			●						
Strategic Direction 2	Health Innovation	Knowledge informs the development of diagnostic, therapeutic, clinical, technological and health system solutions	●			●				
		Evidence informs the implementation of new diagnostic, therapeutic, clinical, technological and health system solutions					●	●	●	●
	Aboriginal Peoples' Health	Indigenous knowledge and ways of knowing are an integral part of Indigenous health research	●			●				
		Knowledge from Aboriginal research is applied to other relevant settings and health issues					●	●	●	●
	Health Promotion & Prevention	Knowledge of biological, psychological, social, environmental and economic determinants of health is advanced	●			●				
		Evidence-informed intersectoral health promotion and disease prevention interventions are implemented					●	●	●	●
Management & Treatment of Chronic Conditions	Knowledge of diagnosis and treatment barriers for multiple, co-existing chronic conditions is advanced	●			●					
	Evidence-informed integrated care approaches improve the diagnosis, monitoring and treatment of multiple, co-existing chronic conditions					●	●	●	●	
Reaping Benefits from Strategic Alliances	Stakeholders are engaged in CIHR decision-making (e.g., priority setting, policies, programs and initiatives)									
	CIHR builds collaborative relationships with health and out-of-health sector stakeholders									
	Canadian researchers are leaders and innovators in international research initiatives		●					●		
	Knowledge from collaborative research in low- and middle-income countries (LMIC) is applied to the Canadian context					●	●			

ⁱⁱⁱ To be reported by a) **research area**: research areas across the spectrum of health, including ethics research, knowledge translation science; and in CIHR priority areas: health innovation, aboriginal research, health promotion and disease prevention, management of chronic conditions, and eHealth; b) **type of research** (discovery, demonstration, validation and application) and c) **type of grantee/awardee**, including gender, age or other demographics, where applicable.
^{iv} CIHR is currently pilot testing methodologies to access, search and report on citations to funded research in 'non-journal' publications such as policies and guidelines.
^v Field analysis identifies whether findings are taken up by other disciplines.

PERFORMANCE INDICATORS

% of grants reporting contribution to more effective health services and products ⁱⁱⁱ	% of grants reporting contribution to improved health of Canadians ^{iv}	% of grants reporting participation of stakeholders in the research process ^{vi}	% of grants reporting new method, new theory or replication of findings ⁱⁱⁱ	% of grants reporting application of findings ⁱⁱⁱ	% of grants reporting potential commercialization outcomes ⁱⁱⁱ	Co-author analysis of publications ^{ii,v}	% of trainees obtaining post-doctoral fellowship in the top 50 highest ranking universities	% of trainees employed in the Canadian research enterprise ^{vii}	no. of reviewers ⁱⁱⁱ	no. of appropriate reviewer assignments	Ratio of CIHR to partner investment ^v	no. of partnership agreements ^{vi}	no. of stakeholders involved in CIHR governance & advisory committees ^{viii}
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^{vi} To be reported by stakeholder type, region and sector.
^{vii} To be reported by sector and position. This indicator is currently based upon the Banting Postdoctoral Fellowships program end-of-award survey.
^{viii} Examples of **stakeholders** include health care/health system/public health practitioners, patients or consumers of the health system/care, study stakeholders, health system/care managers, health system/care professional organizations, federal/provincial representatives, community/municipal organizations, consumer groups, charitable organizations, industry, the media; and other researchers/academics (excluding study stakeholders).

ANNEX B: ONGOING AND EMERGING SIGNATURE AND OTHER PRIORITY-DRIVEN INITIATIVES

CIHR leads the development and implementation of targeted and partnered initiatives that respond to specific health challenges. These initiatives, which include Institute-led, signature initiatives and other priority-driven initiatives, aim to maximize the collective efforts of the many players in the Canadian health research enterprise to mobilize resources and reap the benefits of joint investments in health.

Research Priority A. Enhanced patient experiences and outcomes through health innovation

This research priority focuses on accelerating the discovery, development, evaluation and integration of health innovations into practice so that patients can receive the right treatment at the right time. Over the next five years, we will work collaboratively to:

- increase patient-oriented research capacity, its evidence base and incorporation into policy and practice through the **Strategy for Patient-Oriented Research**;
- promote the use of high-quality evidence on how best to finance, fund, sustain and govern Canada's health care system through the **Evidence-Informed Health Care Renewal** signature initiative;

- improve the delivery of appropriate, high-quality primary health care through the **Community-Based Primary Health Care** signature initiative;
- support translational research for the effective prevention, diagnosis and treatment of complex diseases through the **Personalized Medicine** signature initiative;
- position Canada for the rapid translation of epigenetic discoveries into diagnostic procedures and new therapeutics through the **Canadian Epigenetics, Environment and Health Research Consortium** signature initiative; and
- increase the evidence on drug safety and effectiveness, and the capacity to undertake high-quality post-market research in this area, through the **Drug Safety and Effectiveness Network**.

Research Priority B. Health and wellness for Aboriginal peoples

This research priority focuses on supporting the health and wellness goals of Aboriginal peoples through shared research leadership and the establishment of culturally sensitive policies and interventions. Over the next five years, we will work collaboratively to:

- support the development, implementation and scale-up of interventions and programs that will address Aboriginal health and wellness through the **Pathways to Health Equity for Aboriginal Peoples** signature initiative.

Research Priority C. Promoting a healthier future through preventive action

This research priority focuses on a proactive approach to understanding and addressing the causes of ill health, and supporting physical and mental wellness at the individual, population and system levels. Over the next five years, we will work collaboratively to:

- inform effective intersectoral health promotion and disease prevention strategies that target environmental determinants of health through the **Environments and Health^{ix}** signature initiative;
- support the development, implementation and scale-up of evidence-informed interventions for addiction and substance misuse through contributions to the **National Anti-Drug Strategy**;
- position Canada as a global leader in HIV/AIDS research that has national and global impact on the HIV/AIDS epidemic through the **HIV/AIDS Research Initiative**; and
- support the development of effective policies, programs and strategies that address health, health system, health equity and health policy challenges in low- and middle-income countries through the **Global Health Research Initiative** and the **Global Alliance for Chronic Diseases**.

Research Priority D. Improved quality of life for persons living with chronic conditions

This research priority focuses on understanding multiple, co-existing chronic conditions and supporting integrated solutions that enable Canadians to continue to participate actively in society. Over the next five years, we will work collaboratively to:

- improve the understanding of, and define a unified strategy for, the role of inflammation in chronic disease through the **Inflammation in Chronic Disease** signature initiative;
- support research on prevention, intervention and management strategies for persons affected by Alzheimer’s disease and related dementias through the **International Collaborative Research Strategy for Alzheimer’s Disease** and the **Canadian Consortium on Neurodegeneration in Aging**; and
- support research on interventions and policies aimed at accommodating workers and enabling healthy work through the **Work and Health^{ix}** signature initiative.

^{ix} Emerging initiative under development.