



CIHR IRSC

CIHR Internal Assessment

Report for the 2011 International Review



Canadian Institutes
of Health Research

Instituts de recherche
en santé du Canada

Canada

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This report provides key information for the International Review Panel (IRP) and Expert Review Team, including an orientation to the Canadian Institutes of Health Research (CIHR) and the environment in which it operates, highlights on progress made under the guidance of the first strategic plan, details about CIHR's response to the observations made by the first IRP, an explanation of the directions CIHR is taking in its second strategic plan, and an outline of the scientific and operational opportunities and challenges faced by CIHR. This report is designed to help reviewers frame their questions and address the goals of the Review.

Introduction, History, Vision and Mandate

CIHR was created 10 years ago to replace the Medical Research Council of Canada (MRC). In contrast to MRC, which supported only biomedical and clinical research, CIHR was mandated with supporting the whole spectrum of health research, including health services and public health research, which were formerly under the purview of the National Health and Research Development Program.¹

In addition to this broadened mandate, CIHR was to “excel, according to internationally accepted standards of scientific excellence, in the creation of new knowledge,” and also to ensure translation of this knowledge “into improved health for Canadians, more effective health services and products and a strengthened Canadian health care system.”² The second part of this mandate, which deals with knowledge translation (KT), was novel for a Canadian research agency and unknown territory for most researchers. The Canadian Institutes of Health Research Act (CIHR Act) reflects the KT component of CIHR's mandate with its commitments to “work in collaboration with the provinces to advance health research and to promote the dissemination and application of new research knowledge to improve health and health services,” and “promote the dissemination of knowledge and the application of health research to improve the health of Canadians.”²

Furthermore, CIHR's operating model was fundamentally different from that of its predecessor and other federal research granting councils as it comprised 13 “virtual” thematic institutes. In contrast to the U.S. National Institutes of Health, CIHR's Institutes are neither legislated entities, nor bricks-and-mortar organizations with intramural research programs. Nonetheless, they form the constitutive core of CIHR: “Through these Institutes, researchers will contribute their combined expertise in multidisciplinary approaches to understand the biological, social, economic, psychological and environmental determinants of health.”³

One of the first intents in creating CIHR was to ensure balanced support of the four themes⁴ of health research, defined in the CIHR Act as:

1. Biomedical research (theme 1)
2. Clinical research (theme 2)
3. Research respecting health systems and health services (theme 3)
4. The health of populations, societal and cultural dimensions of health and environmental influences on health (theme 4)

CIHR was also conceived to achieve equilibrium between “open” (or investigator-initiated) funding versus “strategic” (or targeted) funding. The consensus of CIHR’s Governing Council was to move gradually to 30% strategic and 70% open, and indeed the strategic funding proportion increased from 11% in 2000–2001 to 33% in 2009–2010.

The creation of CIHR in 2000, in addition to other new federal funding agencies created around that time (notably the Canada Foundation for Innovation and Genome Canada), has profoundly transformed the health research scene in Canada. The number and size of research grants, as well as the number of researchers and research trainees, have markedly increased. Collaboration has become the norm and interdisciplinary approaches are thriving. Through the institutes, partnerships with either public or private sectors have proliferated, increasing not only the resources that can be invested in common priorities, but also the interest in and uptake of the research results. The immediate outcome has been a significant growth of Canadian publications in all major fields of health research.

The concepts and practice of KT have taken hold among the research community. Through innovative KT approaches, health-policy makers have gained appreciation of the value of health research for informed decision making. CIHR is indeed fully integrated into the Government of Canada’s Health Portfolio and is being regularly asked to provide advice to the Minister of Health on issues of science and technology. These changes have been significant, but the transformation is not complete. A lot remains to be done, in particular to ensure that research impacts on the quality and effectiveness of health care in Canada. Expectations have been raised. The challenge ahead is for CIHR to meet these expectations and maintain momentum in an economic climate very different from the one that prevailed when the organization was created.

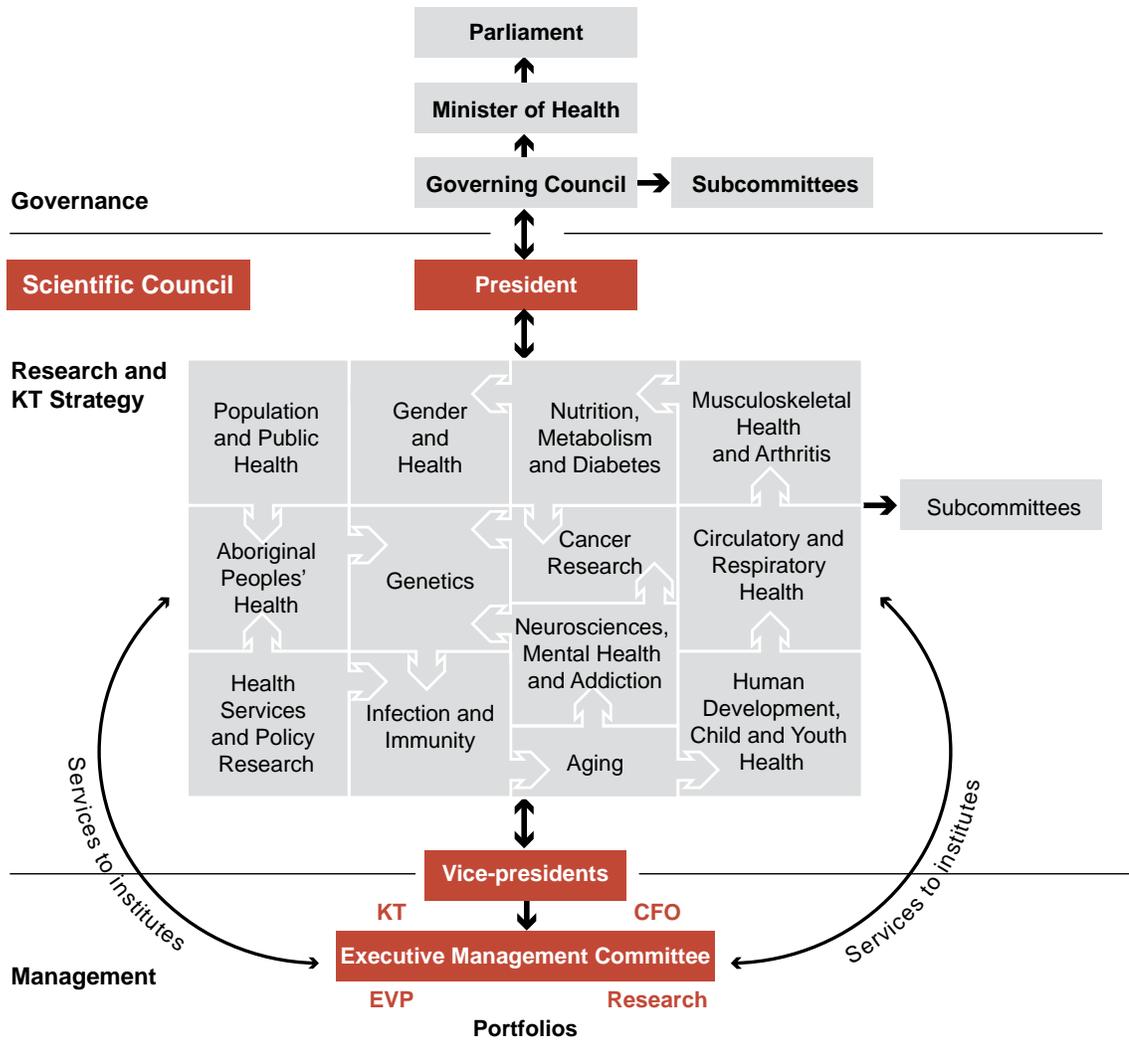
Part 1: CIHR, the Organization

Governance and management

As a federal agency, CIHR reports to Parliament through the Minister of Health and is a part of Health Canada’s Health Portfolio. However, CIHR is governed by its independent Governing Council (GC) of 18 members (including the President) who are appointed by the Governor General of Canada on advice from the Cabinet of Canada (the federal cabinet). GC (Figure 1) is responsible for setting the overall strategic directions for CIHR and approving its budget. As part of its overall responsibility for evaluating CIHR’s performance, GC commissioned this international review and will receive the IRP’s report. GC also appoints the institute scientific directors (SDs) and members of the Institute Advisory Boards (IABs). Before the establishment of the Scientific Council in 2007, members of GC were primarily distinguished health researchers. Now, as vacancies arise, GC will evolve into a true corporate board through the appointment of a broader range of Canadians such as health system managers, health institution managers, senior administrators from academia, industry, governance and ethics experts and health-policy makers. The Deputy Minister of Health (a civil servant) is an

ex-officio, non-voting member. Six subcommittees report to GC: the Executive Committee, the Standing Committee on Finance and Planning, the Nominating and Governance Committee, the Audit Committee, the Standing Committee on Ethics and the Stem Cell Oversight Committee. Where specialist knowledge is advantageous, additional subcommittee members may be recruited from outside GC. The President is both the CEO of CIHR and the Chair of GC, but the vice-chair of GC assumes the Chair at meetings to allow the President to fully participate in discussions. GC usually meets three times a year and has an annual strategic retreat.

Figure 1: CIHR organizational model



The Scientific Council (Figure 1) is the highest-level decision-making forum for science strategy and funding decisions. It is chaired by the President and composed of the 13 institute scientific directors (SD), the vice-presidents, the Director of Ethics, and two non-voting members: the Chief of Research Operations and the Director, Marketing and Communications. Scientific Council meets monthly and provides scientific leadership and advice to GC on health research and KT priorities and strategies, in accordance with the overall strategic directions determined by GC.

Table 1: Executive Management Committee

Position	Focus of Responsibility	Portfolio Functions
Executive vice-president (EVP)	<ul style="list-style-type: none"> Acts as president in his absence Interface with the Minister's office and other federal research agencies Strategic collaboration with other federal research organizations Engagement with federal, provincial and territorial governments and agencies Interface with private sector and relations with industry Implement risk management framework 	<ul style="list-style-type: none"> Governance Strategic Planning, Policy and International Relations Ethics Internal Audit and International Review Information Technology and Administration Analysis/Evaluation
VP research portfolio and chief scientific officer (Research)	<ul style="list-style-type: none"> Science advisor to the President Oversight of scientific initiatives and affairs Identify emerging areas of opportunity and research programs to better address CIHR's mandate Peer review Grants management 	<ul style="list-style-type: none"> Analysis/knowledge creation programs (open grants) Research capacity development (awards) Program planning and process Targeted initiatives Competitions and peer review
VP resource planning and management portfolio and chief financial officer (CFO)	<ul style="list-style-type: none"> Improved forward program planning and evaluation of effectiveness Integrate financial and human resource planning Implement risk management framework Sustained focus on leadership development and human resources strategy 	<ul style="list-style-type: none"> Financial and corporate planning Financial operations and monitoring Legal Affairs Human Resources Roadmap Implementation
VP knowledge translation and public outreach portfolio (KT)	<ul style="list-style-type: none"> Accelerate the capture of the benefits of health research and demonstrate impact Ensure delivery of KT, synthesis and exchange by each institute Support institutes' partnership, citizen engagement and communications activities Extend the CIHR brand with key stakeholders and public 	<ul style="list-style-type: none"> Knowledge translation Partnerships and citizen engagement Communications and public outreach Institute Affairs Pan-CIHR initiatives

A key role for Scientific Council is the selection and development of large multi-institute strategic initiatives. To ensure consistency and increase the evidence base for decision making, there has been a recent shift from *ad hoc* decision making to a regular annual cycle. In March, Scientific Council selects from ideas put forward by its members. The champion(s) of each potential initiative write a concept paper outlining its rationale, scope and alignment with CIHR priorities. If this passes scrutiny, a detailed business plan is developed over the following months. If the plan is subsequently approved, funding is allocated from future-year budgets, relevant funding competitions are planned and a funding opportunity is posted on the CIHR website. The entire process from conception to funding can take more than two years but, to deal with unanticipated events, the President can sanction a fast-track process.

Scientific Council has three subcommittees: Performance Measurement, Planning and Priorities and Management (agenda setting and governance). The day-to-day business of the CIHR corporate office is managed by the President and his executive team (Table 1) who form the Executive Management Committee (Figure 1).

The CIHR Institutes

The institutes lie at the heart of CIHR and are its distinctive and fundamental organizational feature. The slate of 13 institutes adopted in 2000 (Figure 1) was intended to cover the entire universe of health research, with no significant areas, disciplines or issues excluded. Indeed, during the first 10 years of CIHR, every research issue that has arisen has been championed by one or more institutes. The slate is a combination of body systems, disciplines, targeted populations, diseases and themes. Although each institute should address research in all four themes as envisioned at the inception of CIHR, two institutes (the Institute of Health Services and Policy Research and the Institute of Population and Public Health) have mandates chiefly aligned with themes 3 and 4, respectively. As a result, these two institutes have had the added responsibility of serving as theme champions to help the other institutes meet their theme 3 and 4 mandates.

The SDs who head each institute are recognized leaders of the cognate research community, seconded from regular responsibilities while remaining at their home institutions, and devoting nominally 50% of their time to research, though many dedicate a greater proportion to institute responsibilities. The SDs are each assisted by a small staff, some located in Ottawa, some at their home institutions, to monitor the capacity and performance of the research areas within their institute mandate, develop and manage specific targeted research initiatives, form and maintain partnerships for research funding and KT activities, and evaluate outcomes and impacts of the research within the mandate. SDs are aided by the corporate office of CIHR in Ottawa, which exists to support the institutes, for example, with additional expertise on KT tactics and communications, and by providing funding competition, peer review and grants administration services. The corporate office also provides consistency and coordination in policy and ethics matters, international relations, the rules of engagement for partnerships and communications.

Each institute has an ~16-member (to be decreased to 14 in 2011) volunteer IAB primarily composed of researchers, but including some members from the public, private and non-profit sectors, including health practitioners and health care system decision and policy makers. The IABs help the SD draft the institutes' strategic plans (consistent with the overarching CIHR plan), set and evaluate the institutes' research priorities and allocate their research budgets accordingly. Through the IABs and the subcommittees of the Governing and Scientific Councils, CIHR benefits from a constant stream of timely advice from leading researchers and other stakeholders in health research. With the Scientific Council as the decision-making body with respect to strategic initiatives, IABs have been shifting their attention from details of institute budget allocation and programming to providing more strategic direction and advice about partnerships and collaborations and measuring the impact of the institute.

The institutes have played a pivotal role in transforming the health research landscape that CIHR inherited from the Medical Research Council of Canada (MRC). They have been instrumental in identifying priority health problems or neglected areas where there was a need to build research capacity – and to encourage research in those areas through strategic initiatives supported by dedicated funding. Through the development of judicious partnerships and a close understanding of the community and stakeholders, the institutes have leveraged funds and mobilized talent to support research priorities in their fields. Through the mix of approaches required to address these priorities, they have contributed to increased research funding and capacity, particularly in themes 3 and 4.

Although each institute research budget is relatively small (~\$8.5 million per year), the strategic use of funds – individually or in collaboration with other institutes and corporate portfolios – has enabled institutes to invest in neglected or emerging areas of health research, generating new knowledge, building research capacity and developing competence, so that researchers working in these areas can go on to secure continuing support from CIHR’s open funding competitions.

Furthermore, through their membership on Scientific Council, the institutes enable CIHR to reach consensus when it chooses large, multi-institute health research initiatives. While the institutes do not individually control the detailed allocation of most of CIHR’s budget, collectively they exert the determining influence on the strategic agenda of CIHR and its resultant research spending.

The institutes also add value to CIHR by providing specialist scientific acumen as well as the viewpoints of their research communities and relevant stakeholders in health research. They determine the priorities for targeted research and areas where research capacity needs to be built through strategic initiatives. Existing outside the federal bureaucracy, institutes can act nimbly in response to emerging health threats, as during the 2003 severe acute respiratory syndrome (SARS) and 2010 porcine influenza (H1N1) outbreaks and the 2010 medical isotope shortage. By sponsoring workshops and symposia, institutes create a sense of community among the geographically scattered researchers already interested in the health problems that fall within their mandates. They also attract others to become involved, including funding partners and knowledge users. Institutes create a meeting ground where collaborations can develop with individuals and organizations who share common interests.

CIHR’s position within the federal research and innovation system

CIHR is one of three federal research granting councils (Figure 2), known as the Tri-Council. The other two councils are responsible for the funding of academic research in the natural sciences and engineering (the Natural Sciences and Engineering Research Council, or NSERC), and in the humanities and social sciences (the Social Sciences and Humanities Research Council, or SSHRC). In addition to bilateral partnerships in specific interface areas, such as the joint CIHR–NSERC program that supports collaborative research projects between natural sciences and engineering and the health sciences, the Tri-Council cooperates

in funding programs that span the entire range of research disciplines, such as the Networks of Centres of Excellence (NCE), the Centres of Excellence for Commercialization of Research (CECR), the Canada Excellence Research Chairs (CERC), the Canada Research Chairs, (CRC) and the Banting and Vanier studentships. They also cooperate in matters of common policy interest such as ethics and research integrity.

CIHR also collaborates closely with four other federally-funded independent agencies that are important supporters of health research (Figure 2):

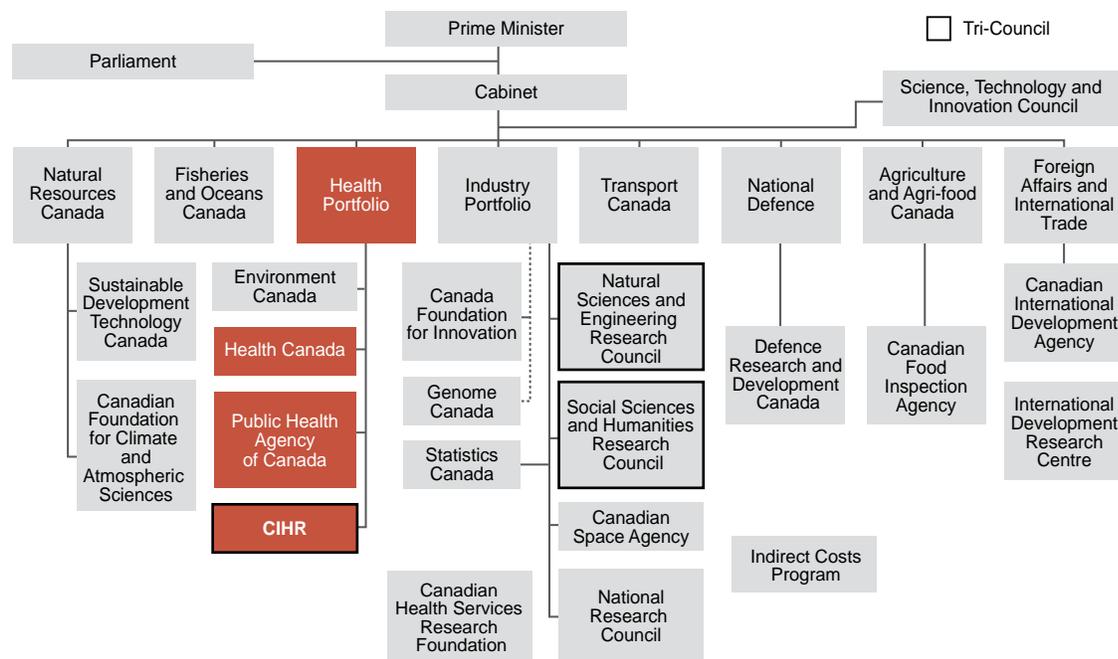
- Genome Canada (established in 2000) supports large-scale genomics and proteomics research projects and regional research platforms.
- The Canadian Health Services Research Foundation (CHSRF) (established in 1997) pioneered the science and practice of KT and knowledge exchange in health research in Canada.
- The Canada Foundation for Innovation (CFI) (established in 1997) provides support for equipment and infrastructure. (For both foundations, approximately half or more of their investments flow to health research.)
- The International Development Research Centre (established in 1970) helps developing countries use science and technology to find solutions to their social, economic and environmental problems, and is a key partner with CIHR on global health activities.
- The Indirect Costs Program (established in 2003) helps alleviate the financial pressures on research being conducted in Canadian postsecondary institutions by providing support for overhead costs, salaries for staff or students who provide research administration support, training costs for workplace health and safety, and other administrative costs.

Whereas CIHR reports to Parliament through the Minister of Health (Figure 2), the other granting councils report through the Minister of Industry. Federal science and technology policy is the responsibility of the Minister of Industry.

Many federal science-based departments and agencies perform intramural research; CIHR has engaged in research or other partnerships with almost all of them.⁵ The largest is the National Research Council, comprising more than 20 bricks-and-mortar institutes across Canada, with a focus on technology development and commercialization.

The Science, Technology and Innovation Council, established in 2007, provides high-level advice to the Cabinet of Canada through the Minister of Industry. Composed of distinguished researchers, leaders of high-tech industry, university leaders and senior civil servants, it determines the priority areas for Canada's science and technology strategy, and issues periodic reports on Canada's performance in research and innovation, the first in 2009.⁶

Figure 2: The federal research and innovation system



Adapted from http://cordis.europa.eu/erawatch/docs/image/CA_Structure_Flowchart.jpg

The Government of Canada's Health Portfolio

The Health Portfolio consists of three major and three minor agencies. The three large agencies are as follows:

1. CIHR
2. Health Canada. This agency protects Canadians against risks from the environment, ensures the safety of consumer and health products, and is responsible for the approval of new drugs. It is also responsible for delivery of health care to First Nations people on reserves and to Inuit communities in the North.
3. The Public Health Agency of Canada. This agency created in 2004 following the SARS outbreak, focuses on health promotion and prevention of chronic disease, health and disease surveillance, and is responsible for infectious disease control and the response to public health emergencies. It works with provincial, territorial and municipal governments, which share the responsibility for protecting public health.

There are regular information and coordination meetings between the civil service heads of the three large agencies.

As a federal agency charged with supporting health research and ensuring that the results are applied, CIHR through its institutes has strong links with the 13 provinces and territories responsible for public health and health care delivery to Canadians. In Canada, the provision of health care services is primarily a matter of provincial or territorial jurisdiction, with the federal government contributing to provincial and territorial health spending through transfer payments while also providing health care to Aboriginal peoples, the military and prisoners. Provinces and

territories receive federal transfer payments (currently at \$38.5 billion per year) if they abide by the five principles of the Canada Health Act (universality, comprehensiveness, portability, accessibility and public administration), which is the legislation that governs Medicare, Canada's universal health insurance program for physician and hospital services. The provision and organization of services that fall outside of Medicare – including most pharmaceuticals, long-term care, dental care and more – is up to each individual province or territory. This reality has contributed to Canada's unique suite of more than 13 health care systems. Financing is usually from a mix of public and private sources. As with many other Organisation for Economic Co-operation and Development (OECD) member countries, total health expenditures in Canada have increased at a rate that exceeds growth in GDP.

Rapidly rising costs for health care are a concern for the provinces, which already allocate 40% to 50% of their budgets for this purpose. As a result, there has been increased collaboration between the federal, provincial and territorial governments in health care policy. For example, the Common Drug Review process now involves the Government of Canada and all provinces (except Quebec) and provides recommendations for or against the inclusion of new drugs in provincial formularies. Discussions are in progress among the provinces to establish a national purchasing agency for drugs and medical supplies. Despite these improvements in coordination, it remains a challenge for the 13 independent health care systems to work together to ensure that a research finding on, for example, improvements in stroke care delivery in rural Nova Scotia is disseminated to and adopted by health care managers in rural Saskatchewan. Many medical services are outside the scope of the Canada Health Act (e.g., home care, dental care), and there are differences among provinces in the public insurance coverage for such services.

Integration of CIHR within the Canadian health research landscape

CIHR's success depends on partnerships with other participants in Canadian health research. Foremost are the universities, hospitals and research institutes where health research is performed. These institutions contribute the salaries of the investigators who receive CIHR grants, and provide and service their work spaces. CIHR maintains close relations with the Association of Canadian Academic Healthcare Organizations, the national association of research hospitals, academic regional health authorities and their research institutes.

Most provinces have health research funding agencies, the largest being in Quebec (Fonds de la recherche en santé du Québec, or FRSQ, with a budget of ~\$100 million in 2008–2009),⁷ Alberta (Alberta Innovates – Health Solutions)⁸ and British Columbia (Michael Smith Foundation for Health Research). Ontario has no comprehensive health research funding agency, but through its Ministry of Research and Innovation supports a number of organizations and programs. In 2003, the provincial agencies formed the National Alliance of Provincial Health Research Organizations (NAPHRO) as a forum for discussion of common issues.

The 27 largest health research charities are members of the Health Charities Coalition of Canada and CIHR, through its institutes, has partnered with most members. Significant mutual advantages to such partnering include pooling resources for joint research priorities, reducing duplication, increasing opportunities for KT, showing CIHR and health researchers to be

responsive to citizen health concerns, engaging those affected by health issues in developing the research agenda and assisting charities with their fundraising for research. CIHR, the members of NAPHRO and the Health Charities Coalition meet twice annually at the Leaders Forum of health research funding agencies.

CIHR's KT mandate includes commercialization. Strong and ethical relations with the private sector are essential, and CIHR has regular discussions with BIOTECanada, representing the biotechnology industry, and Canada's Research-Based Pharmaceutical Companies (Rx&D), the umbrella organization for Canada's research-based pharmaceutical industry. The relationship with Rx&D is formalized in a joint funding agreement that has endured for almost 20 years and is currently being renewed. Since 2000, CIHR and Rx&D member companies have together invested about \$360 million in research conducted in universities and hospitals.

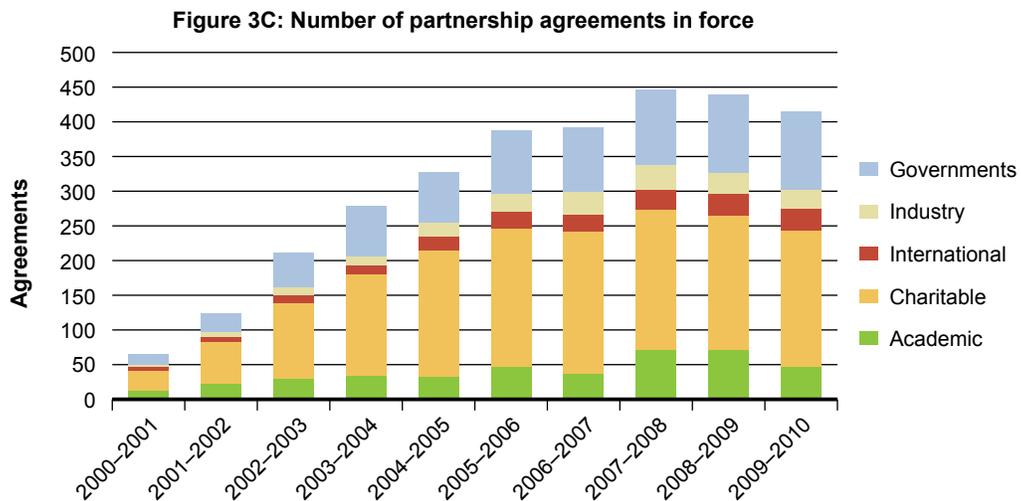
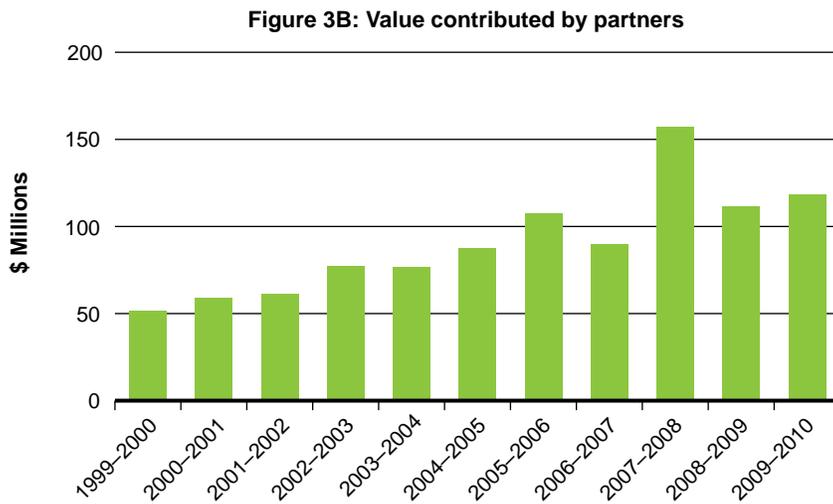
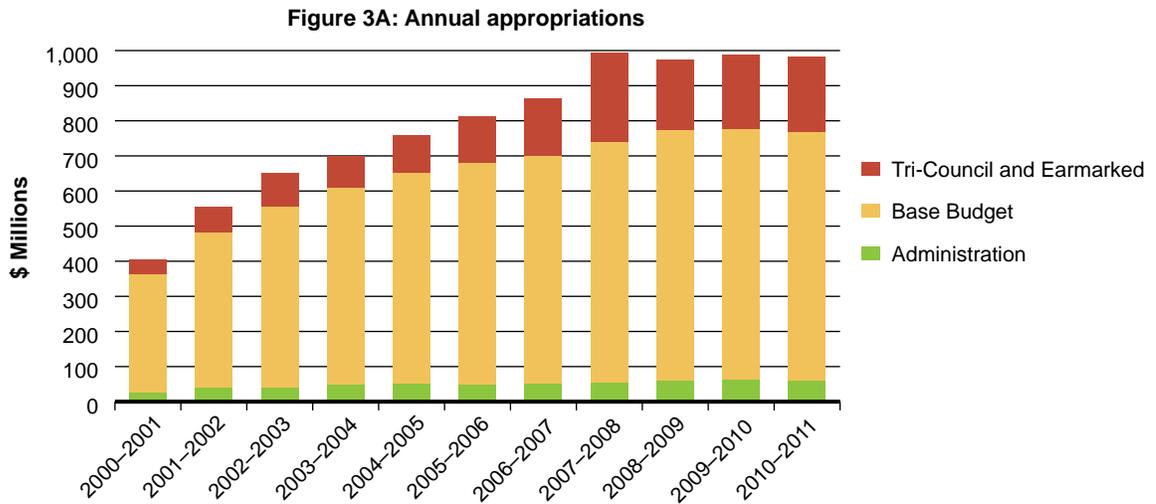
Public advocacy groups for health research in Canada are small and under-resourced. Canadians for Health Research⁹ is the oldest and focuses on public information about the achievements of Canadian health researchers. Research Canada,¹⁰ primarily financed by several large hospital research institutes, is more oriented towards political advocacy. Friends of CIHR¹¹ has a membership of distinguished Canadian researchers, active and retired, and publicizes health research through the awarding of a number of prizes.

Part 2: CIHR's Budget

CIHR receives its budget primarily from funds voted annually by Parliament. Separate funding is voted for CIHR's administrative expenses (e.g., for staff salaries) and its grants and awards programs. CIHR's administrative expenses represent less than 6% of its total budget. All grants and awards funding must be expended by the end of the fiscal year¹² as surplus funds cannot be carried over to future years. There are two budget components: 1. the "base" budget, whose allocation is fully at the discretion of GC; and 2. funding earmarked by the Government of Canada for specific programs such as for HIV/AIDS. This also includes CIHR's share of Tri-Council programs such as the Canada Research Chairs (CRC), the Networks of Centres of Excellence, the Centres of Excellence for Commercialization of Research (CECR) and the Banting and Vanier studentship programs. In the early 2000s, the significant amounts CIHR provided to NCE and CRC programs (\$121 million in 2009–2010) were casually referred to as "flow-through funds." Now the view is that all CIHR funds, whether part of the base budget or the earmarked funds, should be applied to achieve CIHR's strategic plan. For example, research partnerships are being forged between NCEs and CIHR institutes. A good example is the Focus on Stroke training program, which is a partnership between the Canadian Stroke Network, the Heart and Stroke Foundation of Canada, and three CIHR institutes.

CIHR's overall budget has increased 2.5-fold since its inception (Figure 3A), and now stands at approximately \$1 billion. In addition, CIHR has secured significant funding from more than 400 partner agreements, leveraging more than \$100 million dollars in recent years (Figures 3B and 3C).

Figure 3: CIHR's budgets and partners



Allocation of the budget

Figure 4A shows how the total budget, excluding CIHR's share of Tri-Council funding is spent on the various types of support that health research requires. The majority is spent on operating grants of various types, although training and salary programs are also significant. In 2006–2007, CIHR elected to no longer provide equipment – in part a recognition of the growing role played by the Canada Foundation for Innovation to support research infrastructure.

CIHR was founded to increase support for all four themes of health research. Figure 4B shows that funding across all research themes has increased over time. While the share of base budget spent to clinical research (theme 2), population health research (theme 4) and health services research (theme 3) have grown rapidly over the last 10 years (i.e., 4.6 times, 9.8 times and 11.1 times, respectively), the majority of funding remains allocated to support biomedical research (theme 1).¹³

Figure 4: Grants and awards expenditures

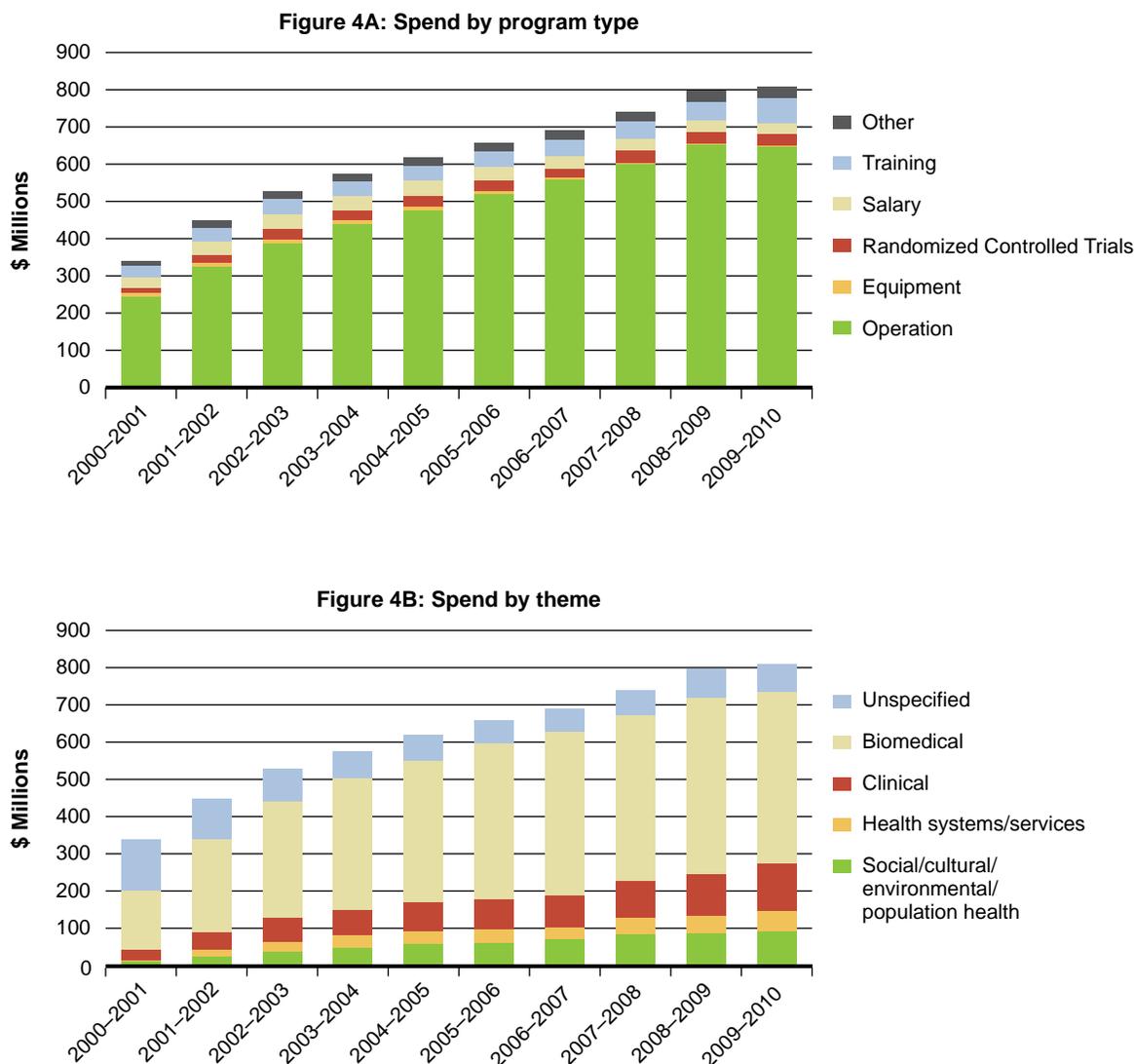
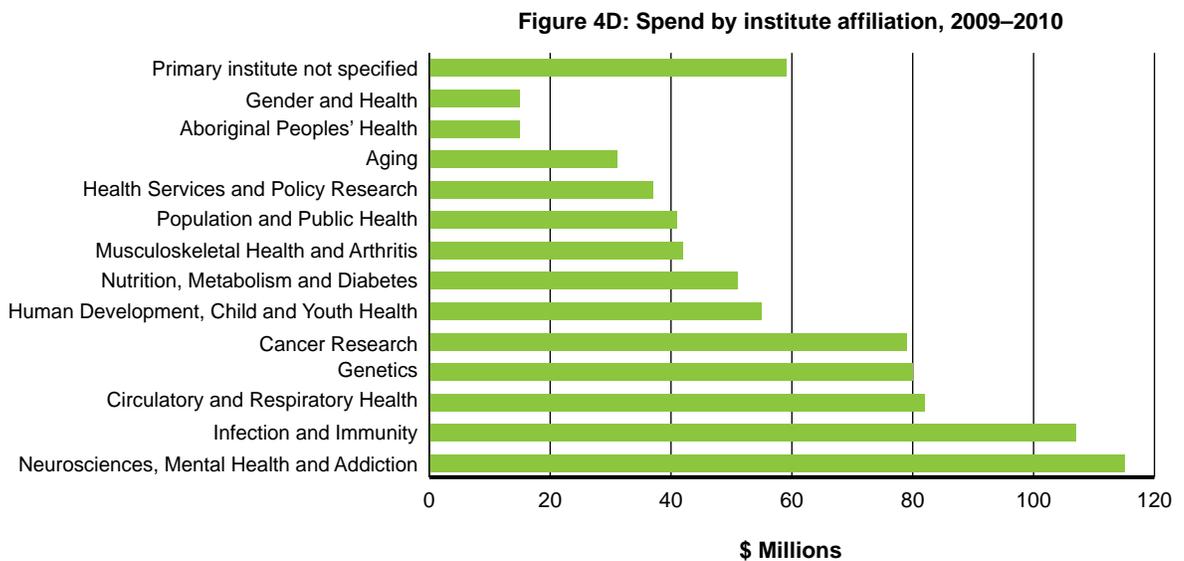
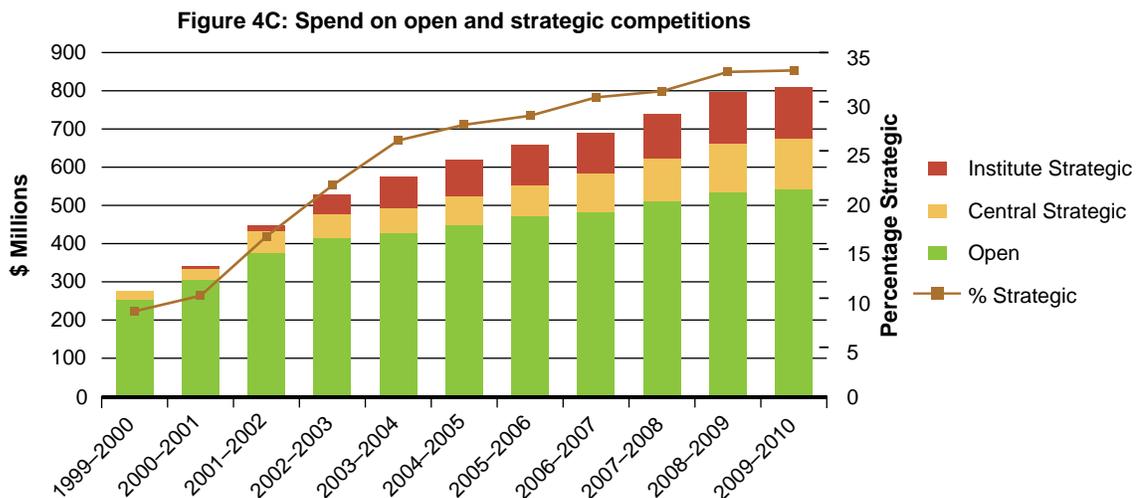


Figure 4C tracks the division of funding between “open” and “strategic.” Open research reflects the priorities of individual researchers while strategic research reflects the stated priorities of CIHR and its institutes. The percentage of funding allocated to strategic initiatives has increased significantly since CIHR’s inception, from below 11% to 33% today. These strategic initiatives are a mix of institute-led investments and increasingly pan-CIHR large strategic initiatives that are funded centrally.

Figure 4D shows the value of all grants and awards (both open and strategic) in 2009–2010 by primary institute affiliation (as self-reported by the grant holders). The resulting data approximates the research capacity within the mandate of each institute. The distribution largely reflects Canada’s strong historical funding of biomedical research, since the largest institutes are those that inherited a legacy of biomedical research from the Medical Research Council, while, for example, the Institute of Gender and Health and the Institute of Aboriginal Peoples’ Health, had to build their communities of researchers largely from scratch.

Figure 4: Grants and awards expenditures (cont’d)

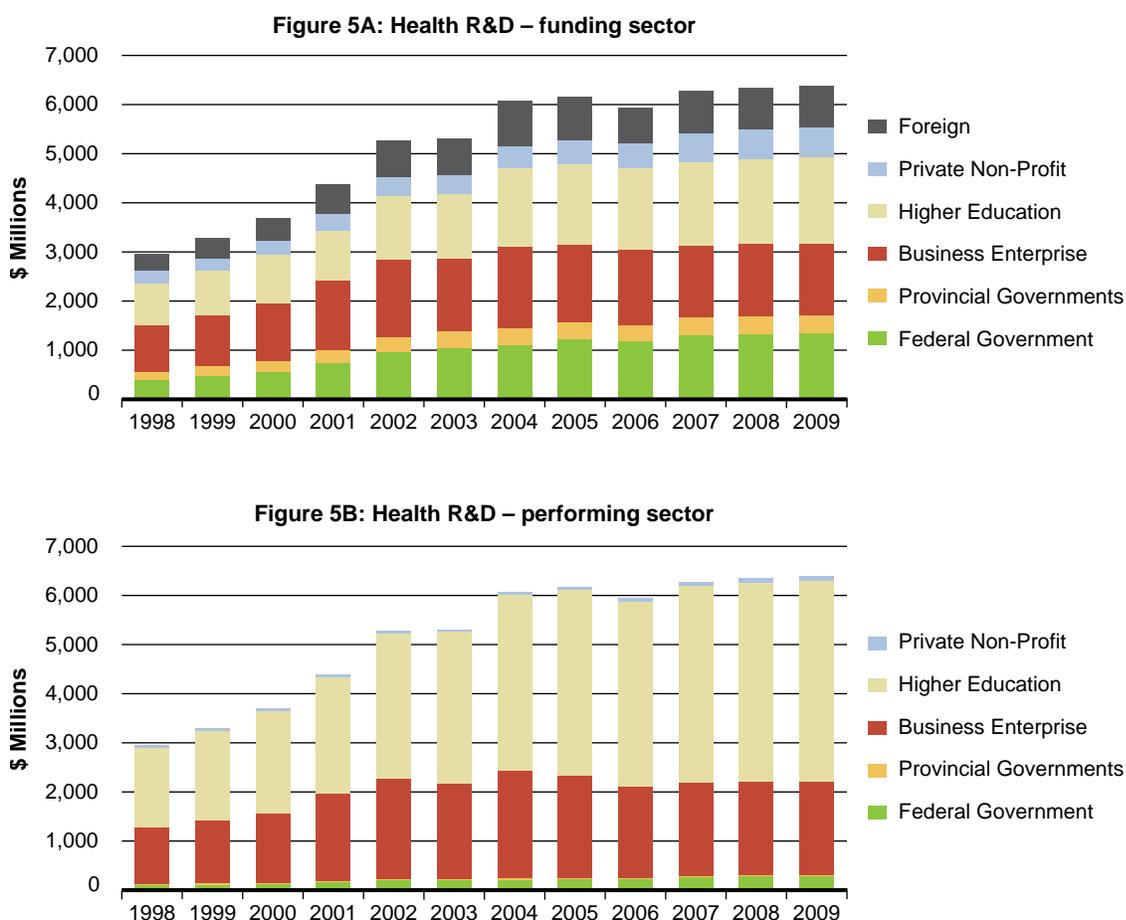


Putting CIHR's budget into context

According to Statistics Canada,¹⁴ total health research funding in Canada was \$6.4 billion in 2009–2010 (Figure 5A), with the higher education sector being the largest contributor in the form of the salaries of investigators. The second largest sector is Canadian business enterprise, but its proportional contribution has decreased over the past decade. The Government of Canada contribution is largely the CIHR budget. Private non-profit organizations, mainly the health charities, contributed \$599 million in 2009–2010 and provincial governments, largely through their own funding agencies, \$362 million. Support from foreign sources, such as the U.S. National Institutes of Health (NIH), the Bill and Melinda Gates Foundation and foreign industry, totalled \$867 million.

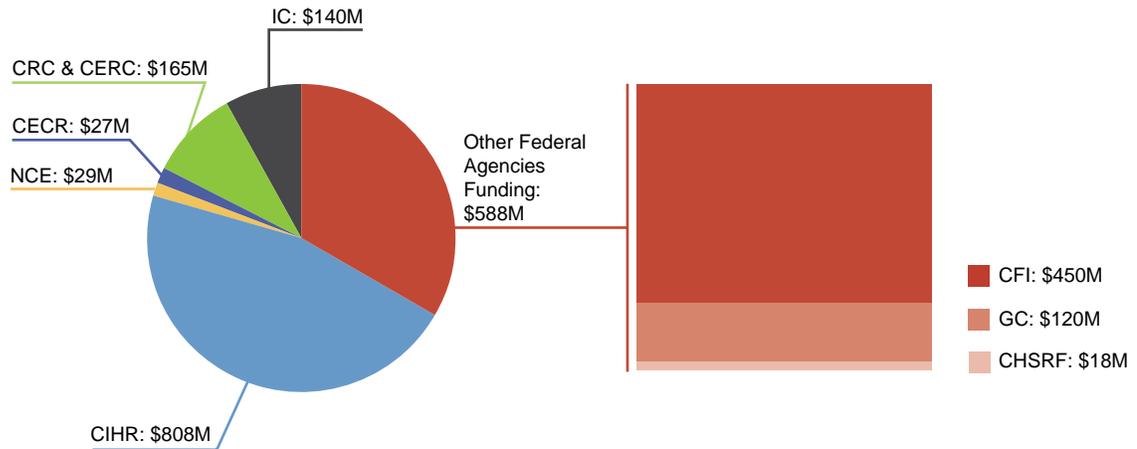
Most Canadian health research takes place in the higher education sector (Figure 5B). Again, business enterprise ranks second, and its share has remained constant. Very little health research is performed by provincial government departments responsible for public health and health care services. A general feature of Canada's research and development (R&D) enterprise is that the value of research carried out by the higher education sector, expressed as a percentage of GDP, is second only to Sweden. In contrast, the relative value of research performed by business enterprise is low: on this indicator, Canada ranks 15th among OECD nations, well below the average.¹⁵

Figure 5: Canadian spending on health research 1998–2009



A notable feature of the Canadian environment for health research has been the increased investment by the Government of Canada over the past 13 years in a variety of new research funding programs intended to make Canada more competitive and attractive to international scientific talent. Figure 6 illustrates the distribution of federal funding programs for health research for the 2009–2010 fiscal year.

Figure 6: Federal health research funding programs, 2009–2010

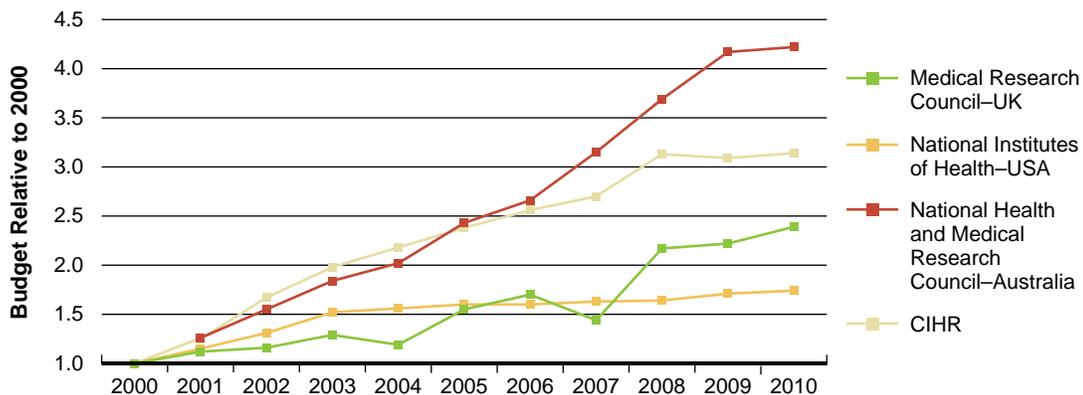


NCE: Networks of Centres of Excellence **CIHR:** Canadian Institutes of Health Research
CRC: Canada Research Chairs **CECCR:** Centres of Excellence for Commercialization of Research
CECCR: Canada Excellence Research Chairs **CFI:** Canada Foundation for Innovation **GC:** Genome Canada
CHSRF: Canadian Health Services Research Foundation **IC:** Indirect Costs

Another perspective from which to view the CIHR expenditures (including flow-through programs) is in relation to the cost of providing health care in Canada (i.e., \$929 million, compared to \$183 billion in 2009, or roughly 0.5%.¹⁶ Total public sector health research investment is less than 2% of health care costs.

In comparison with budget increases over the decade for agencies in other leading health research nations, CIHR has done well (Figure 7).

Figure 7: Increases in budget since 2000 (=1) for national health research funding agencies



CIHR's grants and awards programs

Table 2 lists the major CIHR funding programs. The Open Operating Grant Program is the largest, a \$405 million investment in 2009–2010, supporting 3,791 grants. There are 225 other active operating grant programs listed on CIHR's public database for 2009–2010.

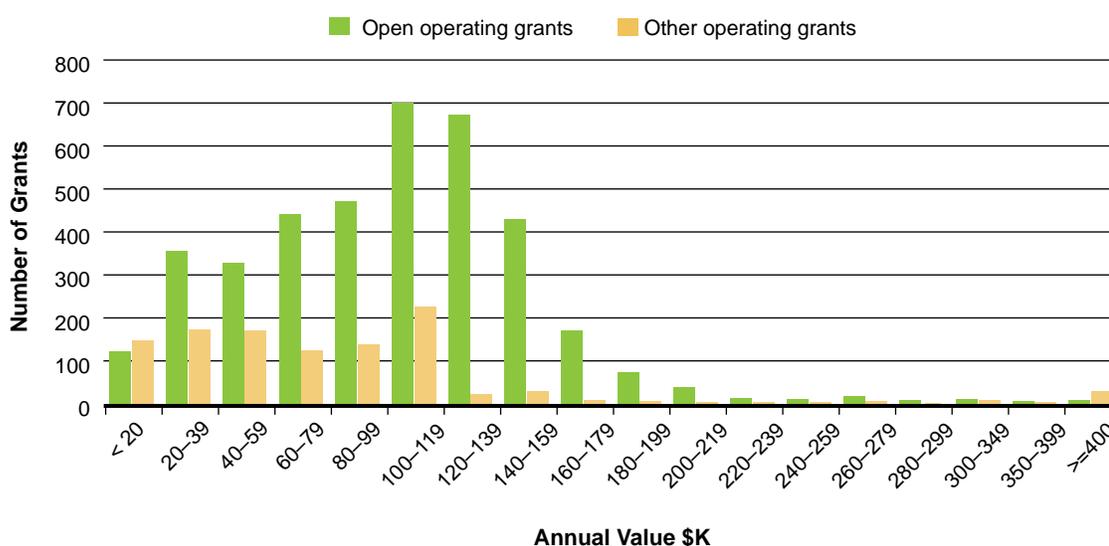
Table 2: CIHR's major program types, or funding schemes, 2009–2010

Program	Details	#	% of Budget
Open Operating Grants	To support research proposals by individuals and self-assembled teams in all areas of health research.	3,791	43.5
Catalyst Grants	To generate preliminary data, validate methodology or tools, and/or explore novel research ideas.	254	1.6
Team/Emerging Team Grants	To support collaborative research addressing an important health issue.	174	9.1
Randomized Controlled Trials (RCTs)	To support experiments which test the efficacy or effectiveness of health care services or health technologies.	81	3.3
Commercialization and Industry-partnered Grants	To encourage collaboration between academia and industry and assist researchers with commercialization of intellectual property.	117	3.0
Knowledge Translation Grants	To support all aspects of the translation of research findings into improved health for Canadians, more effective health services and a strengthened health care system.	157	1.4
Other Operating Grants	Includes: international partnerships, large strategic programs, and institute-specific funding programs.	1,054	15.1
Subtotal			77.0
Salary Awards	To support researchers through a contribution to their salary.	1,219	12.7
Subtotal			12.7
Studentships/Fellowships	Stipend for highly qualified candidates who are pursuing an MSc or PhD degree, or post-PhD studies in a health-related field in Canada or abroad.	2,734	7.3
Training Programs	Awarded to a group of excellent mentors who collaborate to offer an interdisciplinary research training program.	57	1.5
Subtotal			8.8
Miscellaneous	Various small grants and awards programs	453	1.5

Figure 8 shows the distribution of grant values (amount per year) for 2009–2010, with open operating grants shown in green shading. The median open operating grant value (as measured by the actual amount expended that fiscal year for all new grants awarded that year) is \$107,000 (average \$104,000), whereas the median grant value for other operating grants is \$77,000 (average \$152,000). The latter include grants classified as operating grants but that

do not fall within the Open Operating Grant Program such as institute-led funding programs, partnered research grants and grants linked to CIHR research initiatives. There are some large strategic team grants, raising the average value, but the majority of strategic grants are much smaller than open operating grants. This proliferation of small programs is being reviewed through a new approach to strategic investment planning at Scientific Council, including limiting the number of initiatives an institute can launch independently to one per year.

Figure 8: Annual value of operating grants (all programs), 2009–2010



In 1999–2000, the median value of an open operating grant was \$67,000. Using the NIH Biomedical Research and Development Price Index¹⁷ as the inflator, today’s median grant would be worth \$73,700 in 1999 dollars (Table 3), so there has been a real increase in the value of these grants. Since most materials and supplies have to be imported from the U.S., the recent rise in the value of the Canadian dollar has further increased the purchasing power of CIHR grants. Although CIHR grants may seem small in comparison to those of the NIH, they exclude investigator salaries and institutional overhead. A separate Tri-Council Indirect Costs Grant program provides \$325 million a year to research institutions. The allocation of these funds is based on the grants they receive from the Tri-Councils, using a sliding scale that ranges from 80% to 20% of direct costs, with smaller institutions receiving the higher rates.

The number of grants and awards has increased over the past 11 years, as shown in Table 3. The greatest increases have been in Salary Awards, which have more than doubled in number, due to the advent of the Canada Research Chairs. The apparently modest increase in the number of open operating grants (1.7 times) does not include all the other types of operating grants; taking these into account the total number of operating grants has increased two-fold. Although the number of funded randomized control trials is unchanged, the median value of funded trials has increased almost six-fold. Taking inflation into account, the real value of CIHR’s doctoral research awards and postdoctoral fellowships have declined, although there have been significant increases in the number of awards.

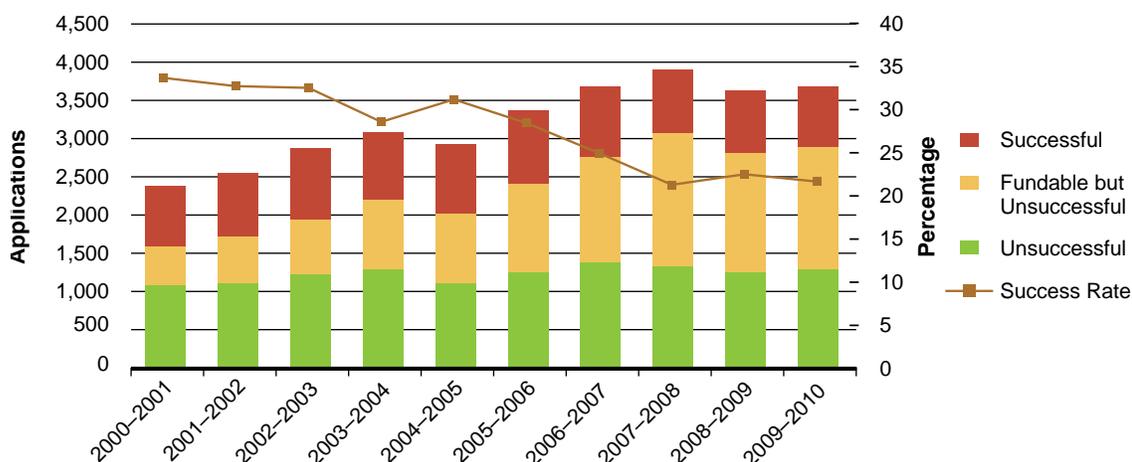
Table 3: Comparison of number and value of grants and awards, 1999–2000 and 2009–2010

Program Type	1999–2000		2009–2010			Notes
	#	Annual Value	#	Annual Value	Value in 1999–2000, \$	
Open Operating Grants	2,285	\$67,000	3,791	\$107,000	\$73,700	Median value of an open operating grant, inflated using NIH Biomedical Research and Development Price Index (BRDPI).
Randomized Controlled Trials (RCTs)	81	\$50,000	81	\$296,500	\$204,200	Median value, inflated using NIH BRDPI.
Salary Awards	497	\$50,000	1,219	\$60,000	\$41,300	Includes Canada Research Chairs: value shown is for CIHR New Investigator Award, inflated using Consumer Price Index (CPI).
Postdoctoral Fellowships	564	\$35,000	744	\$40,000	\$24,500	Stipend for PhD holder, inflated using CPI.
Doctoral Research Awards	750	\$19,000	1,270	\$21,000	\$14,500	Includes Canada Graduate Scholarships: value shown is for CIHR Doctoral Research Award, inflated using CPI. For 2010–2011 value of stipend raised to \$30,000.

For all CIHR’s annual open grants and awards competitions, an increase in application pressure has exceeded the growth in program budgets, resulting in declines in competition success rates, as illustrated by Figure 9 for open operating grants. However, several factors have mitigated this decline. The first is that many institutes fund or partially fund additional operating grants that are close to the pay line through the mechanism of Priority Announcements (PA). These are published well in advance of the competition deadline and describe areas of enquiry or types of grants that an institute wishes to encourage. Furthermore, in order to accommodate as many meritorious applications as possible, CIHR imposes across-the-board cuts to the budgets recommended by its peer review committees; for the last four competitions these have averaged 14%. Going forward, CIHR intends to ensure that the value of its operating grants grows with general inflation.

Finally, it should be noted that as there are two operating grant competitions per year, and applications may be submitted an unlimited number of times, the eventual success rate by application is much higher than the success rate by competition.¹⁸

Figure 9: Applications to open operating grants competitions



Part 3: CIHR’s Evolving Role in Canada’s Science and Technology Landscape

Canada’s science and technology strategy and the Government of Canada’s priorities

Canada’s 2007 Science and Technology Strategy, called *Mobilizing Science and Technology to Canada’s Advantage*,¹⁹ outlines three Canadian advantages: an entrepreneurial advantage, a knowledge advantage and a people advantage. It also outlines four priority areas: health and related life science and technologies; environmental science and technologies; natural resources and energy; and information and communication technologies. In September 2008, the Government of Canada accepted the recommendations of the Science, Technology and Innovation Council (STIC) that defined detailed sub-priorities. For health and related life science technologies these are: regenerative medicine, neuroscience, health in an aging population, biomedical engineering and medical technologies. In recent competitions of the Canada Excellence Research Chairs, Networks of Centres of Excellence and Centres of Excellence for Commercialization of Research, Industry Canada has imposed that Tri-Council research funding be oriented towards these priority areas.

CIHR has also taken into account these sub-priorities in its 2009–2014 strategic plan. In addition, it responded to priorities of the Minister of Health and to emerging health threats in launching specific requests for applications. Examples include: the rapid-response SARS research initiative and consortium in 2003; the wait-times studies of 2005 to inform provincial and territorial ministry of health decisions on benchmarks; the 2006 Pandemic Preparedness Strategic Research Initiative; and research on H1N1 and relevant public health and health care system interventions in 2009. In response to the recent radioisotope shortage, CIHR launched the Initiative in Alternative Radiopharmaceuticals for Medical Imaging, followed by the formation of a clinical trials network for medical imaging to accelerate translation of

research discoveries on isotopes and imaging technologies into clinical practice. Most recently, at the request of the Minister of Health, CIHR, in collaboration with the Multiple Sclerosis Society of Canada, convened a meeting of leading North American researchers to provide advice on the appropriateness of launching a pan-Canadian therapeutic trial on venous angioplasty as a treatment for multiple sclerosis.

Changes in the nature and location of Canadian health research

CIHR's emphasis on multidisciplinary collaboration as the way to advance knowledge about the complex problems of health in society has helped to accelerate the structural changes in the Canadian research environment already under way at the end of the last century. A key evolution has been the rise of the academic health sciences centres and associated teaching hospital-based research institutes. Although each is affiliated with a university, these institutions are independently governed with respect to research organization, structure and priorities. The Association of Canadian Academic Healthcare Organizations noted that, in 2006, member institutions received more than \$3 billion in research funding and almost 80% of public funding for health research²⁰ and, in 2008, ran two competitions exclusively for research hospitals, spending \$492 million.

Less confined by the traditional disciplinary structure of universities, academic health care organizations have more easily adopted interdisciplinary working arrangements – as well as making the translational link between bench and bedside – by combining research and patient care within the same organization. A recent report by the National Task Force on the Future of Canada's Academic Health Sciences Centres²¹ proposed that they form the nucleus of an Academic Health Sciences Network, “created by health sciences universities, academic health care organizations and other provider organizations with the goal of improving patient and population health outcomes through mechanisms and structures that develop, implement and advance integrated health services delivery, professional education, and research and innovation.” While challenging the traditional role of universities as the leaders of the research enterprise, this model has the advantage of facilitating translational research and subsequent KT, and assembling regional communities of interest that are well placed to interact with the public and policy makers.

There has also been a shift of CIHR-funded research into community-based organizations that exist entirely outside the academic sphere, including those that serve Aboriginal peoples and those that provide care and education services to defined patient groups, in particular to HIV/AIDS community organizations. Further investment in Aboriginal peoples' health and a greater emphasis on primary health care research will accelerate this trend.

Evolution of Canada's health research workforce

CIHR-supported researchers (including trainees with studentships or fellowships)²² have increased from 5,370 in 2000–2001 to 13,790 in 2009–2010. Support for themes 3 and 4 has particularly increased. For example, the number of students with CIHR awards working in these two theme areas increased from 56 in 2000–2001, or 6.5% of the total, to 485 in 2009–2010, or 25% of the total. In 2009–2010, CIHR supported health researchers and trainees at 332 research institutions in every province of Canada. The regional distributions of funding and funded institutions in 1999–2000 and 2009–2010 are shown in Figure 10. Many of the newly funded institutions do not have a medical school, but have strengths in the social sciences that contribute to the broadened mandate of CIHR, such as the Universities of Northern British Columbia,²³ Regina, Windsor, le réseau de l'Université du Québec and Acadia University.

Figure 10A: Regional distribution of funding in 1999–2000 (MRC) and 2009–2010 (CIHR)
Figure 10B: Number of research institutions 1999–2000 and 2009–2010



Source: CIHR funding database.
 Direct payments are excluded in the figure above.

The Regional Partnerships Program has been created to assist small provinces in building their research capacity. It funds applications from the six participating provinces (Saskatchewan, Manitoba, New Brunswick, Prince Edward Island, Nova Scotia and Newfoundland) that fall just below the funding cut-off but are highly rated in CIHR’s open competitions and are also relevant to priorities identified by each province. These applications are funded on a 50-50 basis between CIHR and provincial sources. Table 4 provides provincial comparisons of CIHR funding.

The absence of any CIHR funding allocated to the three territories does not mean that northern health research is neglected. Since 2000, CIHR has invested in excess of \$46 million in more than 100 northern health research projects, involving more than 30 institutions.

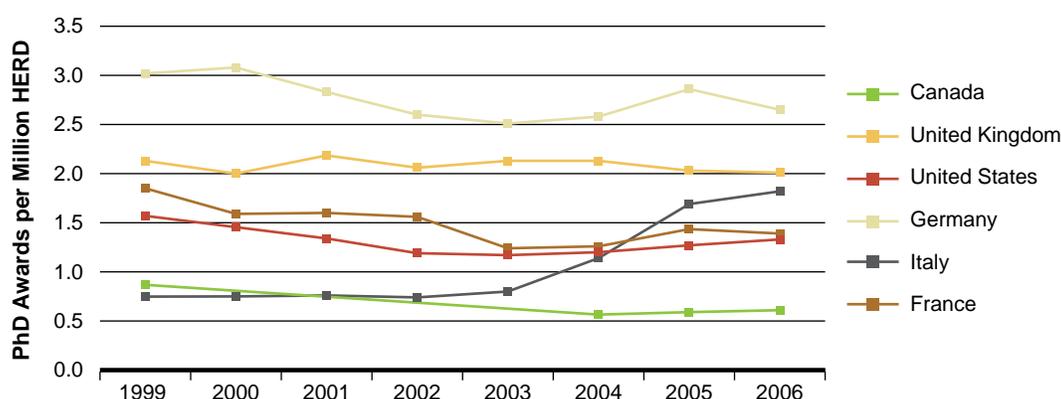
Table 4: Provincial comparisons

Province	Increase in Funding, 1999–2000 (MRC) – 2009–2010 (CIHR)	Per Capita CIHR Funding, 2009–2010, \$
Quebec	163%	29.69
Ontario	197%	26.03
Nova Scotia	267%	26.03
British Columbia	345%	24.91
Alberta	104%	19.90
Manitoba	126%	16.24
Saskatchewan	266%	9.96
Newfoundland and Labrador	91%	7.00
Prince Edward Island	340%	4.19
New Brunswick	1,159%	1.46

Preparing for tomorrow: research trainees

Canada’s science and technology strategy emphasizes a “people advantage” and the need to grow the number of highly qualified personnel involved in the knowledge economy. Historically, Canada has a low rate of PhD production relative to its spending on research (Figure 11), especially in the sciences and technology, where it ranks 22nd among OECD countries for the percentage of PhDs awarded in the sciences.²⁴ Accordingly, recent Tri-Council programs have focused on research trainees, featuring stipend levels competitive with additions to other postgraduate employment options.

Figure 11: PhDs awarded per million expenditures on R&D in the higher education sector



Source: OECD data reproduced in Performance of the UK Research base, 2009.
HERD: Higher Education Research and Development

Through the new Tri-Council programs and its own longstanding trainee programs, CIHR now supports approximately 4,800 graduate students and 2,000 postdoctoral fellowships through three different funding schemes (Table 5). In 2009, the Government of Canada provided three-year, non-renewable funding for 200 more doctoral and 800 more master's-level Frederick Banting and Charles Best Canada Graduate Scholarships. The announcement in the federal government's Budget 2010 of a prestigious new Tri-Council postdoctoral awards program, the Banting Fellowships, will allow CIHR to offer 20 to 25 more postdoctoral fellowship awards annually.

There is no comprehensive source of information about the total number of health research trainees in Canada, because numbers are reported by university departments, not by subject of study, and research relevant to human health can be conducted in departments ranging from anthropology to zoology, neither of which are classified as health or medical departments. However, to the extent that health-related disciplines can be identified, there have been recent increases in enrolments at Canadian universities: MSc enrolments increased from 5,820 in 1999 to 9,660 in 2006 (the latest year for which data are available), and PhD enrolments from 1,614 to 2,487.²⁵

Trainees can be supported by CIHR in three ways: with an individual award, through a CIHR Strategic Training Initiative in Health Research (STIHR) or as a graduate or post-graduate student paid from the supervisor's CIHR operating grant, the most frequent form of support.

CIHR supports more than two-thirds of health research graduate students in Canada, with the others supported by health charities, provincial health research organizations, institutional teaching stipends and other awards. Undergraduate students are supported as summer or co-op students (Table 5).

Table 5: Estimates of the total number of trainees supported directly and indirectly by CIHR and other sources, 2008–2009

	Level of Training				
	Undergraduate	Master's	Doctoral	Postdoctoral Fellows (PDF)	Other
CIHR Personnel award	281	373	1,005	839	70
STIHR	193	227	410	257	
Operating grants	2,000	1,600	1,100	900	
CIHR Total	2,474	2,200	2,515	1,996	
Estimates of the number of trainees supported directly by awards from health charities and provincial health research agencies					
All programs	365	474	411	503	
Estimates of the number of trainees in health research supported directly by the other two federal granting agencies					
NSERC	1,210	461	587	112	
SSHRC		52	120	17	
Grand Total	4,049	3,187	3,633	2,628	

From Begin-Heick, N. 2010 “An environmental scan of the support for training in health research in Canada”.

A radical departure from the traditional support for research trainees was the introduction in 2003 of the CIHR STIHR Program, which provides a six-year grant to a group of mentors to organize an interdisciplinary training program. The grant is used to recruit and support trainees, for trainee exchanges between participating institutions and for developing educational materials. Following a positive evaluation of this program, a second round of 50 STIHR grants was jointly funded from institute and global budgets in 2009, an investment of \$89 million over six years.

CIHR has little information about the needs of health research sectors for new talent and will begin to collect information about the post-award employment of trainees who receive CIHR support. It seems likely that the majority of trainees find employment outside academia. CIHR needs to know if the students it supports have the skills sought by prospective employers.

Canada’s performance in health research

Reports from individual institutes and existing CIHR publications²⁶ provide many examples of Canadian strengths. We elected to focus here on bibliometric data that provide an overview of performance. Figures 12 to 15²⁷ compare Canadian performance with that of the other most productive nations in the selected field. The four fields selected (medicine, neuroscience, biochemistry, genetics and molecular biology, and immunology and microbiology) represent 91% of 2008 Canadian publications²⁸ relevant to health. In these broad fields of health research, Canadian-authored publications have increased in

quantity since CIHR was established, and to a greater extent than some other established research-intensive nations.²⁹ It should be noted that the “medicine” field includes health policy, health services, epidemiology and population health and the clinical specialities.

Canada is usually among the top four nations for citations per paper. Figures 12B to 15B show citations per publication relative to publications from the U.S. (=1).

Figure 12A: Growth in medicine publications

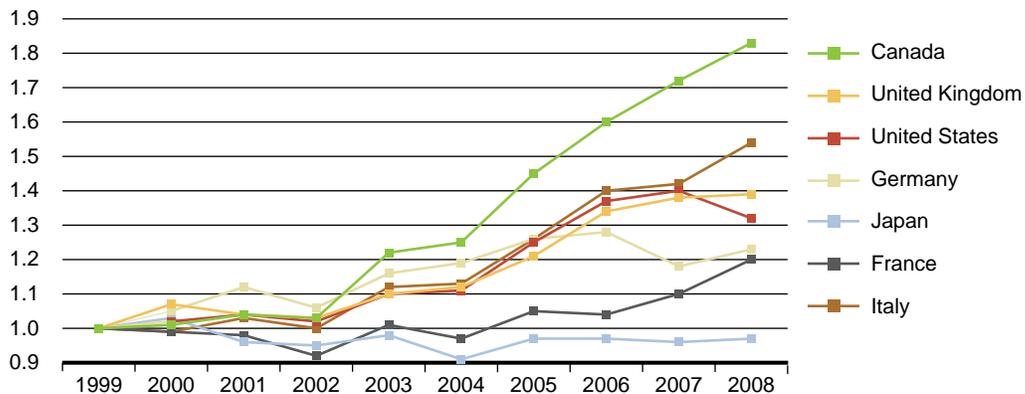


Figure 12B: Relative citations

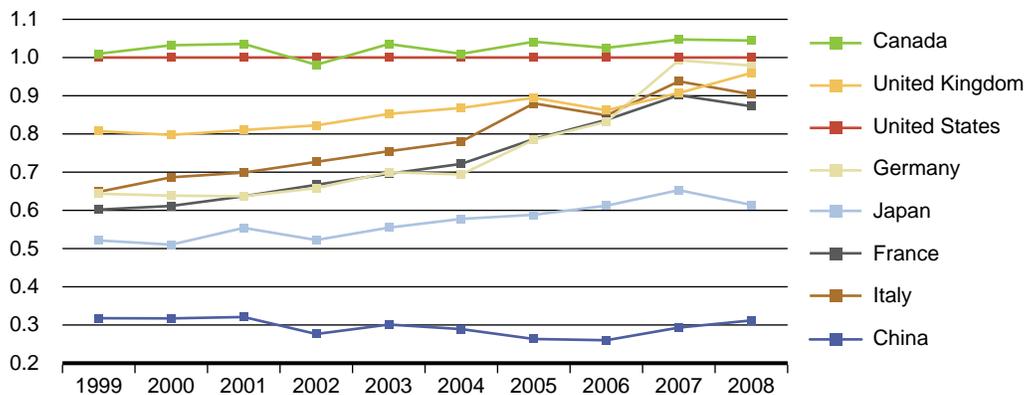


Figure 13A: Growth in neuroscience publications

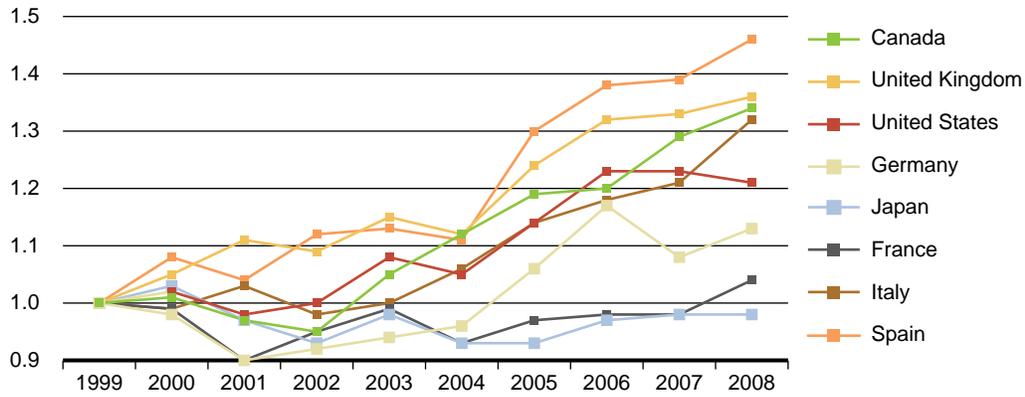


Figure 13B: Relative citations

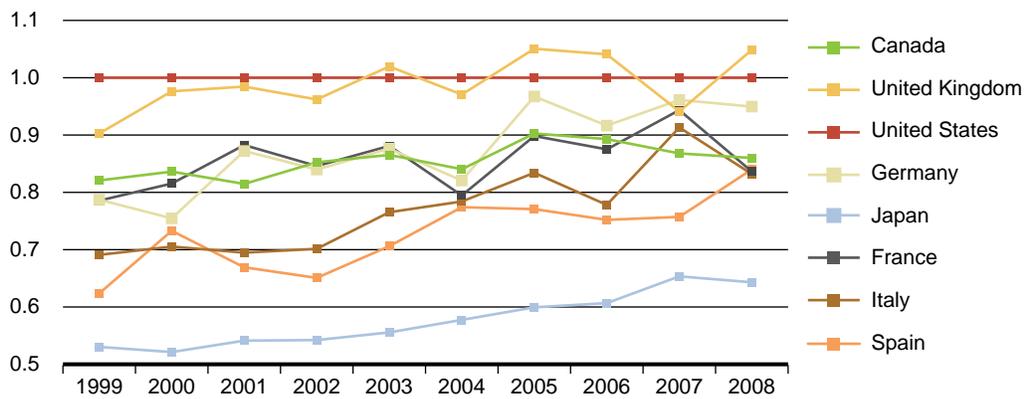


Figure 14A: Growth in biochemistry, genetics and molecular biology publications

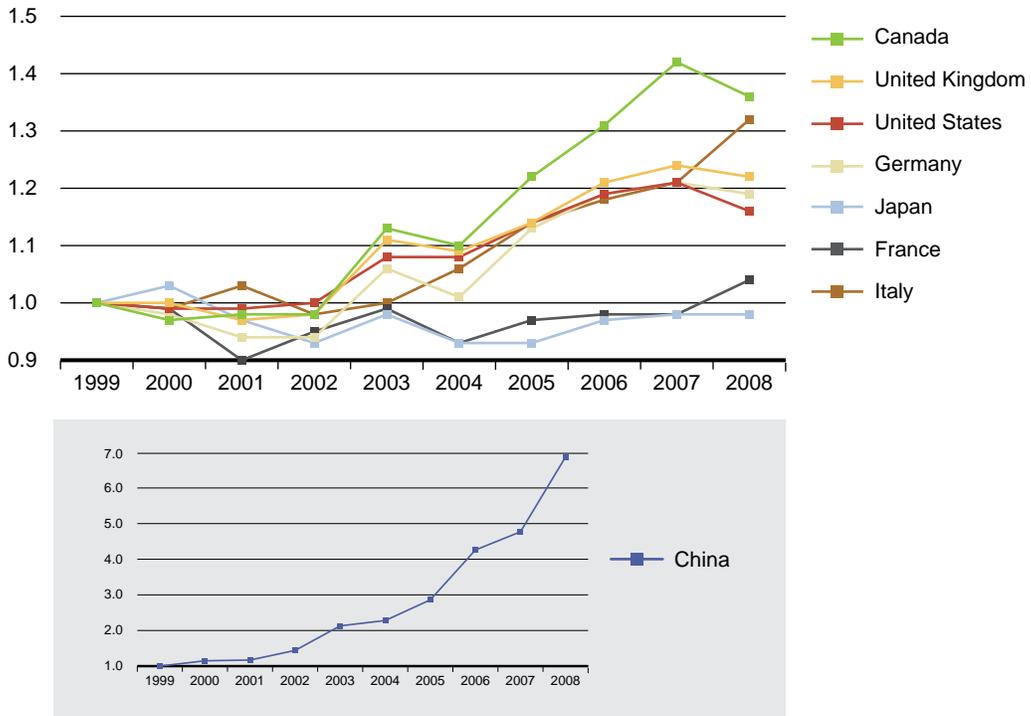


Figure 14B: Relative citations

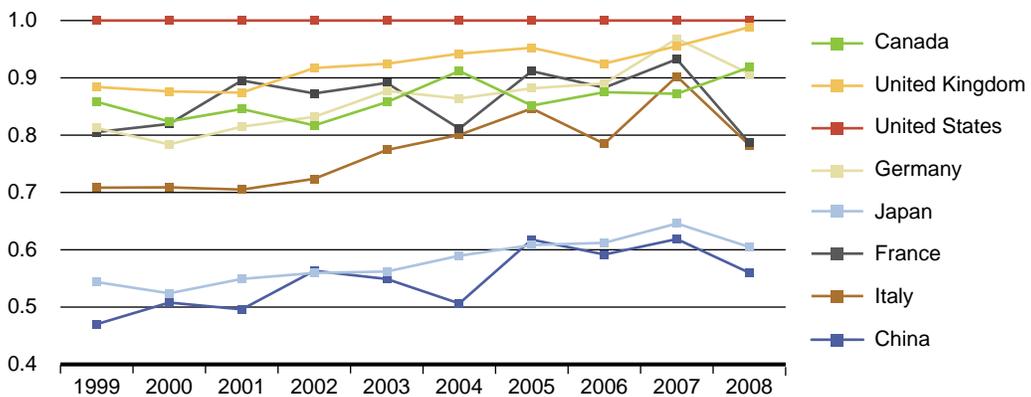


Figure 15A: Growth in immunology and microbiology publications

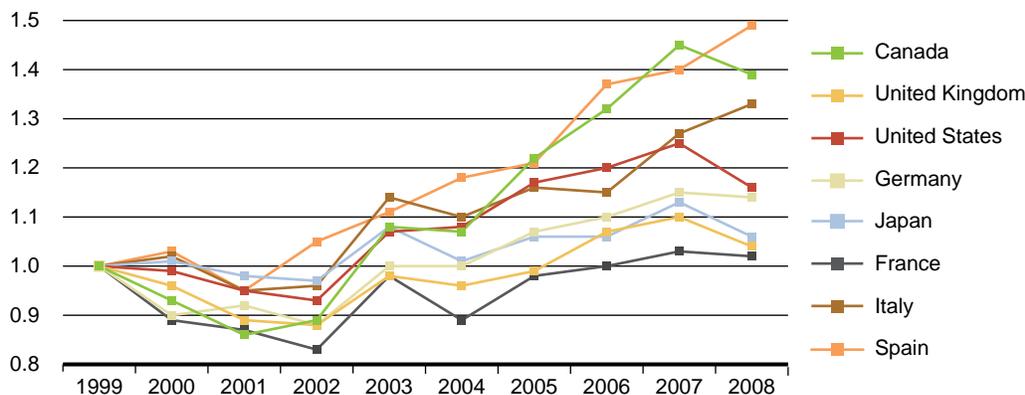


Figure 15B: Relative citations

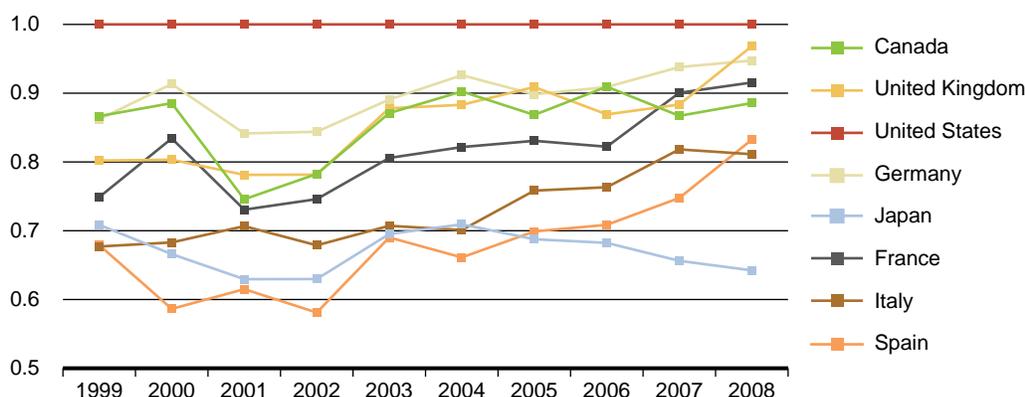
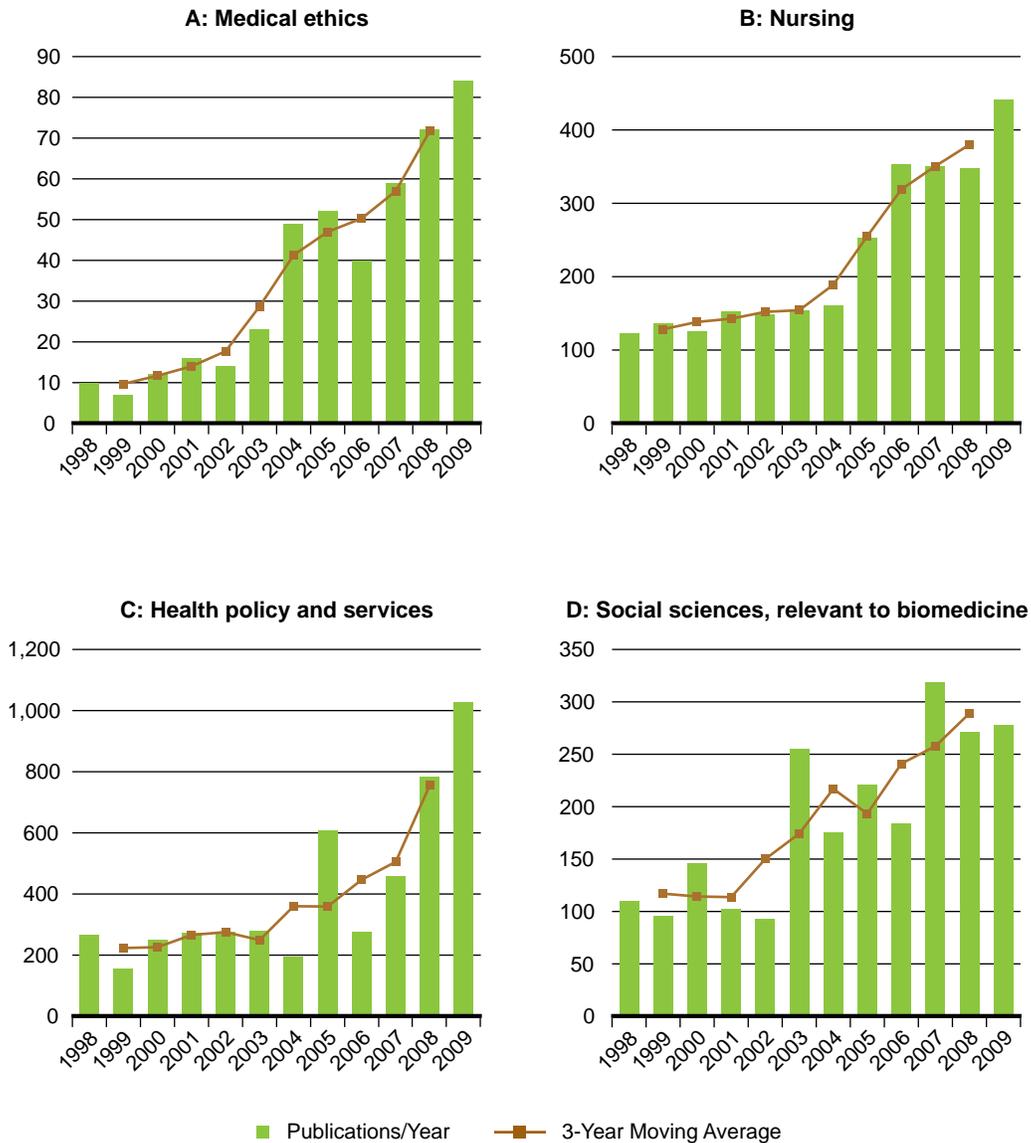


Figure 16A–D³⁰ shows the growth in Canadian publications for more specific subfields of special relevance to the broadened mandate of CIHR, such as health ethics (eight-fold increase) and health policy and services (five-fold increase).

Another indicator of quality is the representation of Canadian authors among the most highly cited publications. With Canadian authors on 3.5% of the world’s publications in medicine, we would expect to see three to four Canadian publications in the top 100 most-cited publications. However, among the 100 most-cited 1999 publications, seven have Canadian authors. Among 2006 publications, the latest year for which there is a significant citation history, 13 have Canadian authors.³¹ Canadian publications are also over-represented in the highest-ranked journals, with 5.3% Canadian publications in the 20 highest-impact journals in medicine for 2008. This finding is corroborated by a 2009 study³² that found Canada ranked third, behind the U.S. and Switzerland, for the proportion of health publications appearing in the top 5% of journals, as defined by impact factor. Canada ranked second in impact factor in the fields of epidemiology and preventive and occupational/environmental

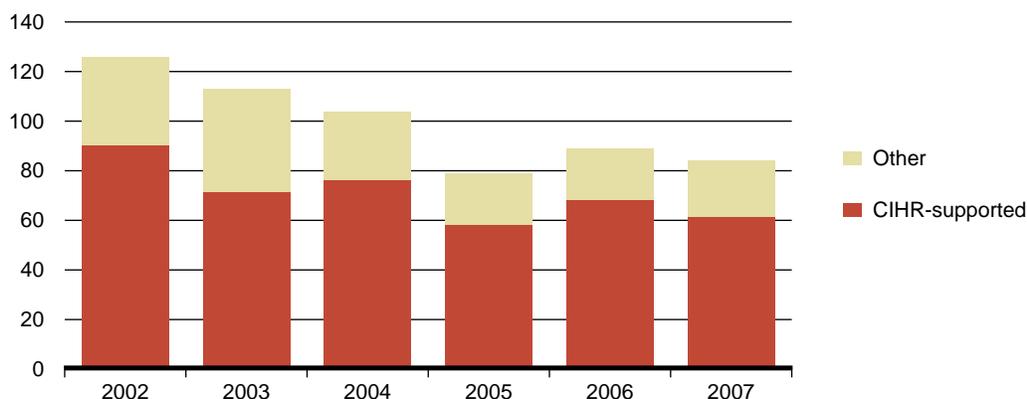
medicine, but much lower in public health.³³ Another international comparative study³⁴ concluded “the fact that the scientific production of researchers in Canada is higher (when adjusted for GDP) compared with other regions around the world deserves careful attention by the worldwide scientific community, as well as by public and private funding organizations, to identify the key determinants contributing to the cost-effective research productivity of this country”.

Figure 16: Growth of Canadian publications in selected areas relevant to its expanded mandate



CIHR-supported research is involved in the majority of health-related U.S. patents granted to Canadian inventors³⁵ (Figure 17).

Figure 17: U.S. patents related to health awarded to Canadian inventors

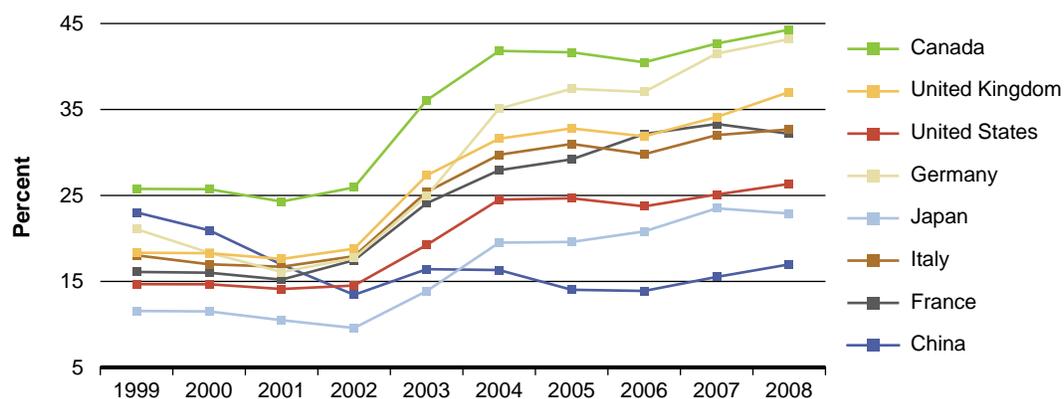


Collaboration and interdisciplinarity

The increase in international collaboration by Canadian researchers mirrors the worldwide trend, and Canadians are among the most collaborative (Figure 18 shows medicine publications only, but the same trends are evident in all other major categories). Publications co-authored with researchers from other nations have greater citation impact than purely domestic publications. For example, publications on stem cells between 2000 and 2006 that were Canadian–foreign collaborations were cited on average 44 times, while purely domestic papers were cited 29 times. In the area of health care policy and services, the citation counts over the same period averaged 16 for international collaborations and eight for domestic publications.

Consistent with the trend to increased collaboration, the average number of applicants associated with each CIHR operating grant (all programs) was 5.0 in 2009–2010, compared to 1.7 in 1999–2000. Inter-departmental and inter-institutional collaboration is common: out of a sample of 200 operating grants funded in 2009–2010, 37 involved investigators

Figure 18: Foreign collaboration – percentage of papers from each country with co-authors from another country



working in different departments in the same institution, and another 75 involved collaborations between investigators from different institutions. CIHR's investment in programs that specifically encourage interdisciplinary research has increased from \$47 million in 2000–2001 to \$112 million in 2009–2010.

Part 4: CIHR 2005–2010

Achievements related to Blueprint, CIHR's first strategic plan

The first five-year strategic plan, CIHR's Blueprint for Health Research and Innovation, or Blueprint, was published in 2003–2004. Therefore, during the first International Review in 2006, CIHR was in the middle of the period covered by Blueprint. Now that CIHR's second strategic plan, Health Research Roadmap: Creating innovative research for better health and health care, 2009–2010 to 2013–2014, or Roadmap, has superseded it, CIHR's can report on its Blueprint objectives.

Box 1: Blueprint's five strategic directions

1. *Strengthen Canada's health research communities.*
2. *Address emerging health challenges and develop national research platforms and initiatives.*
3. *Develop and support a balanced research agenda that includes research on disease mechanisms, disease prevention and cure, and health promotion.*
4. *Harness research to improve the health status of vulnerable populations.*
5. *Support health innovations that contribute to a more productive health system and prosperous economy.*

Blueprint committed CIHR to follow five strategic directions (Box 1). Highlights of CIHR's actions that address the five strategic directions, and in which the institutes have been key players, include:

- support for new funding programs to encourage high-risk research and novel collaborations, with the growth of CIHR-funded researchers from 9,640 in 2003–2004 to 13,790 in 2009–2010
- rapid launching of research programs that address emerging threats to public health including SARS and pandemic influenza
- support for large cohort studies, research data centres and the Cochrane Collaboration; launch of several joint institute/corporate-funded large strategic initiatives, e.g., Regenerative Medicine and Nanomedicine (Box 2), and Global Health

- continued growth in the support for research in health services and population health research (Figure 4B)
- an emphasis on the health of vulnerable populations, with a quadrupling of funding in this area from \$10.8 million to \$44.6 million between 2003–2004 and 2008–2009
- a revitalized approach to KT, emphasizing partnerships with knowledge users and researcher education about the relevance and meaning of KT to all themes of health research, to the extent that the KT function is one of the features of CIHR that is best known internationally

Box 2: CIHR Regenerative Medicine and Nanomedicine Initiative

The Regenerative Medicine and Nanomedicine Initiative (RMNI) is one of CIHR's most successful large strategic initiatives, having committed \$84 million on Team and Catalyst grants since 2003. Although the RMNI topic does not fall clearly within the mandate of any one Institute, CIHR recognized its importance and the Institute of Genetics, the Institute of Musculoskeletal Health and Arthritis and the Institute of Neurosciences, Mental Health and Addiction spearheaded the development of the initiative, which now involves eight Institutes, the Ethics Office and the KT Portfolio, as well as 12 partner organizations, including the Canadian Space Agency.

Annual funding opportunities are available in nanotechnology applied to health, stem cells, tissue engineering, rehabilitation sciences and related ethical, economic, environmental, legal and social issues. RMNI has also held a large number of workshops, including a Canadian Workshop on Multidisciplinary Research on Nanotechnology in 2008. Organized by the Tri-Council, along with Health Canada, the National Research Council, Environment Canada and Industry Canada, the workshop brought together researchers and representatives from government, industry and citizens' groups. The participants identified emerging issues in nanotechnology, including its ethical and economic implications, potential impact on the environment and public health and gaps in regulation and policy.

CIHR's investment in RMNI seems to be paying off in terms of high-quality Canadian research. In both regenerative medicine and nanomedicine, Canada's share of world publications has increased, as has their citation impact.

CIHR expected that these actions would result in a number of outcomes, grouped under five broad headings. Table 6 lists in detail the broad and specific Blueprint objectives, and in the second column are listed the actions to which CIHR committed. The third column reports on the outcomes achieved; in some cases, these are described in quantitative terms, in others as examples of actions taken. Many of the individual items mentioned in the table are described in more detail elsewhere in this report and in the institute reports.

Table 6: Blueprint achievements

Objective	Action	Achievement
Outstanding Research		
1. Support the creative proposals of excellent Canadian health researchers across the full spectrum of health research.	Strengthen Canada's capacity for excellent and ethical health research by providing grants, adequate in number and value, to support the very best proposals of individuals and teams of health researchers.	Increased number and value of grants and introduced Catalyst, New Emerging Team and Team Grants to encourage high-risk research and the support of new and established collaboration.
	Support applications from all research communities relevant to health, to continue to broaden the scope of CIHR-funded research.	Funded more researchers (9,640 in 2003–2004, 13,790 in 2009–2010) and institutions, especially in health services and population health themes.
2. Stimulate and sustain research that capitalizes on key scientific opportunities, addresses important and emerging health issues of concern to Canadians and contributes to the health of society worldwide.	Support excellent, ethical and innovative research responsive to institute-identified research priorities.	Introduced large number of institute-sponsored research programs, many described in institute reports.
	Increase support for research that contributes to improvements in the health status of vulnerable populations.	Increased funding for research related to vulnerable populations from \$10.8 million in 2003–2004 to \$44.6 million in 2009–2010.
	Increase support for research initiatives in health promotion and disease prevention.	Increased funding for research related to prevention and health promotion from \$19.8 million in 2003–2004 to \$55.5 million in 2009–2010.
	Respond to emerging health threats with targeted programs of health research support.	Rapid response to SARS, pandemic influenza, isotope shortages.
3. Encourage and support interdisciplinary, collaborative research designed to resolve complex health issues.	Establish and sustain innovative programs for interdisciplinary collaborative research that are accessible to investigators working in all areas of health research.	Introduced Team and New Team grants. Funding for interdisciplinary programs increased from \$81.1 million in 2003–2004 to \$112.5 million in 2009–2010.
	Enhance the ability of CIHR's peer review system to appreciate and evaluate interdisciplinary collaborative research proposals.	Created new interdisciplinary peer review panels, e.g., Gender and Health, Children's Health.
	Support research on the ethical, legal and sociocultural issues related to health and the delivery of health care as an integral part of the multidisciplinary approach to complex health problems.	Created special funding allocation for ethics research, created new peer review committee. Ethical issues a required part of training programs.

Table 6: Blueprint achievements (cont'd)

Objective	Action	Achievement
Outstanding Research (cont'd)		
4. Stimulate research activities that accelerate the translation of health research into action.	Strengthen support for intervention research and clinical trials with potential to directly affect quality of care, quality of life and the effectiveness of the health system.	Increased funding for clinical trials, support for larger and multinational clinical trials. Clinical trials can now also be funded from open operating grants budget allocation.
	Establish and sustain innovative programs to support researcher collaboration with the industry sector.	Established Centres of Excellence for Commercialization of Research. Enhanced Proof of Principle program.
5. Increase Canadian contribution and visibility in international initiatives in health research.	Support selected, large-scale international initiatives where Canadian researchers lead or make a unique contribution to international efforts.	Structural Genomics Consortium, Cancer Stem Cell Consortium, Grand Challenges in Global Health and HIV/AIDS Vaccines.
	Increase the number of bi- or multilateral collaborative agreements with research agencies in other nations, in priority areas.	China–Canada Joint Health Research Initiatives, Canada–China Norman Bethune Health Research Scholarships Program, India–Canada Collaborative Teams in Childhood Obesity Research, Canada–Finland Team Grant: Early origins of addiction in children and youth.
	Improve opportunities for Canadian researchers to participate in research activities funded by international agencies, including providing support for establishing collaboration and developing proposals.	Made changes to Grants and Awards Guide to publicize and facilitate opportunities for international collaboration through CIHR’s major funding programs. Created and expanded the Global Health Research Initiative.
Outstanding Researchers in Innovative Environments		
1. Build health researcher capacity across the broad spectrum of health research in a vibrant, innovative and stable research environment.	Increase the supply of health researchers in areas of need identified by institutes by supporting early and mid-career training opportunities.	Increased support for New Investigators, Canada Research Chairs, Tier 2. Institute-sponsored career awards increased from \$4.7 million and 115 awards in 2003–2004 to \$11.6 million and 191 awards in 2009–2010.
	Increase the number of outstanding new investigators and retain established researchers, with special attention to increasing the participation of women and Aboriginal people in health research.	Number of investigators supported with salary awards increased from 1,081 in 2003–2004 to 1,222 in 2009–2010. Number of investigators funded for IAPH-relevant research increased from 350 in 2003–2004 to 574 in 2009–2010. IAPH established Network Environments for Aboriginal Health Research to provide an appropriate environment and resources that would encourage Aboriginal and non-Aboriginal students to pursue careers in Aboriginal health research.

Table 6: Blueprint achievements (cont'd)

Objective	Action	Achievement
Outstanding Researchers in Innovative Environments (cont'd)		
	Provide programs designed to attract and repatriate outstanding health researchers to Canada from abroad.	Tri-Council Canada Research Chairs, Chairs of Excellence, Vanier Scholarships, Banting Fellowships.
	Complement and build on current research capacity building initiatives and programs established by relevant stakeholders (e.g., Canada Research Chairs, CFI, Canada Graduate Scholarships).	Established CIHR-NSERC joint Collaborative Health Projects, which support projects involving any field of the natural sciences or engineering and the health sciences; CFI and CIHR joint proposals for regional/national clinical research initiatives, combining infrastructure and operating support.
	Support programs and networks designed to reduce regional disparities in the training and establishment of researchers.	Evaluated Regional Partnerships Program in 2005 and showed it was successful. Renewed the program with some changes to make it more responsive to provincial priorities.
	Support policies, systems and practices that promote a culture of ethics and integrity in health research.	Introduced compulsory registration and disclosure of outcomes of CIHR-funded clinical trials. Introduced open-access policy.
2. Develop, support and sustain new national platforms and initiatives for health researchers.	Build the Canadian Lifelong Health Initiative with partners: a major longitudinal and intergenerational study to follow cohorts of newborns and seniors to delineate the genetic, psychosocial, cultural, economic and environmental determinants of health and healthy aging.	Embarked on three large cohort studies: Canadian Healthy Infant Longitudinal Development (CHILD) Study, Canadian Longitudinal Study on Aging and the Canadian Partnership for Tomorrow Project (cancer and chronic diseases: supported by Canadian Partnership Against Cancer and regional cancer agencies).
	Establish a modernized Canadian platform for clinical research including national networks, core facilities, sustainable support mechanisms for clinician researchers, and innovative mentoring and training opportunities.	Engaged in significant consultations with clinical research community, resulting in CIHR's Strategy on Patient-Oriented Research (SPOR). Invested with CFI in improving clinical research infrastructure in Canada.
	Support initiatives intended to develop, expand and refine research approaches and methods used by researchers.	Launched several programs focused on development of tools and methodologies, e.g., Catalyst Grants for Invention – Tools, Techniques and Devices to encourage Canadian investigators to develop novel tools and techniques, or novel applications of existing tools and techniques; Catalyst Grants in Population and Public Health for development and validation of new inventions, tools, methodologies, protocols, theoretical models or frameworks.

Table 6: Blueprint achievements (cont'd)

Objective	Action	Achievement
Outstanding Researchers in Innovative Environments (cont'd)		
	Support the development of, and improve access to, health and health services data to enable researchers to undertake outstanding research.	Supported Statistics Canada research data centres at Canadian universities.
3. Engage Canadian youth in health research.	Develop and implement programs to initiate young Canadians into health research.	Developed and implemented Youth Engagement Strategy. Formed partnerships with existing groups similarly engaged.
4. Enhance and sustain supportive research training environments and networks.	Support innovative training programs that provide students and postdoctoral fellows with experience in interdisciplinary, collaborative and inter-sectoral (e.g., industry, policy, community-based) research environments.	Funded second round of 50 Strategic Training Initiative in Health Research Programs in 2008, representing an \$89 million commitment over six years. In collaboration with other federal agencies, support Industrial R&D Internship Program, which provides opportunities for graduate students and PDFs to undertake short-term research projects in collaboration with an industrial partner.
	Support mentorship of new researchers and establish networks of collaboration and support.	Many institutes have developed trainee and new investigator workshops: networks develop as a result of many New Team and Team Grant projects.
Transforming Research into Action		
1. Advance research in the use of health knowledge.	Support research that seeks to determine the most effective strategies and techniques for dissemination and exchange of knowledge created through health research.	Projects on the science of KT funded as open operating grants, reviewed by new KT peer review committee. Additional grants funded through Priority Announcements and KT Portfolio. \$20.2 million invested since 2004–2005.
	Support research designed to determine effectiveness of new or changed health policies, programs and practices.	Investments in health services and policy research increased from \$32 million in 2003–2004 to \$55.5 million in 2009–2010.
	Work in partnership with research institutions, other government agencies and industry to ensure timely commercialization of intellectual property derived from research.	Introduced Proof of Principle program, subsequently tuned to provide better assistance. Introduced Science to Business (S2B) program designed to encourage individuals with PhDs in a health related field to pursue an MBA.

Table 6: Blueprint achievements (cont'd)

Objective	Action	Achievement
Transforming Research into Action (cont'd)		
2. Develop and sustain a broad range of individuals involved in the exchange and use of health knowledge.	Provide programs designed to support a culture change among health researchers and institutions by supporting students, postdoctoral fellows, young investigators and scholars and their mentors who demonstrate a commitment not only to conducting outstanding health research, but also to working collaboratively with potential users of research in ways likely to improve KT.	Introduced end-of-grant funding supplements to assist KT of research findings. Introduced prestigious CIHR Knowledge Translation Award. Developed KT Capacity Development Initiative supporting KT trainees. Published a KT Handbook for researchers. Developed educational modules, Summer Institutes for researchers and trainees and the KT Trainee Network. Developed and implemented Policy on Access to Research Outputs. Established Commercialization Advisory Committee.
3. Develop and sustain innovative environments that enable the effective use of health knowledge.	Develop and support programs in partnership with stakeholders that bring together partners and bridge the gaps between research, practice, programs and policy.	Established Partnerships for Health System Improvement (PHSI) program. PHSI supports teams of researchers and decision makers conducting applied and policy-relevant health systems and services research that responds to the needs of health care decision makers. Developed Knowledge to Action program to build KT capacity at community, regional or provincial level.
	Develop and implement mechanisms that foster effective communications and enable researchers and users of research knowledge to build productive relationships.	Introduced Best Brains Exchanges and Expedited Knowledge Synthesis, which provide rapid expert advice in response to specific needs of provincial health policy makers. Provided grants for planning and dissemination for PHSI grant teams of knowledge producers and users. Synthesis grants support teams of researchers and knowledge users to produce syntheses and scoping reviews of importance to knowledge users.
	Support initiatives that will identify effective approaches for users to translate health knowledge.	Publicized success stories from all CIHR-supported initiatives through four KT Casebooks.
	Monitor and evaluate worldwide approaches to knowledge translation, and engage with international partners who have a similar mandate or interest.	An ongoing activity of the Knowledge Translation Branch. CIHR's policies in the area of trial registration have contributed to international standards, and its policy on open access has become the de facto Canadian standard for other funders. CIHR's KT approaches have attracted favourable international comment.

Table 6: Blueprint achievements (cont'd)

Objective	Action	Achievement
Effective Partnerships and Public Engagement		
1. Engage in mutually beneficial international partnerships.	In consultation with stakeholders, develop and implement a comprehensive framework to guide partnership activities.	Published The CIHR Partnerships Casebook to advertise examples of a variety of successful partnerships.
	Promote productive relations with relevant international stakeholders to gain synergies, enlarge scope of inquiry and pool resources.	Numerous international partnerships created: from 14 in 2003–2004 to 32 in 2009–2010.
	Develop and implement initiatives and programs that promote international and best practices, excellence and ethics in health research.	Partnered with UK and Australia in Project Retrosight to identify payback from health research. PubMed Central Canada launched in 2010.
2. Develop and maintain a broad base of stakeholder support across Canada.	Establish and maintain collaborative relationships with stakeholders to meet organizational mandate and goals.	Established Leaders Forum where all sectors of research funders meet regularly. Established numerous institute-sponsored workshops and consensus processes for setting research agendas in targeted areas.
	Develop and implement proactive strategies to attract and secure partnership opportunities.	Developed Partnership Management Strategy to assist CIHR staff in forming and maintaining productive partnerships.
3. Develop and maintain a coherent and coordinated approach to research across the full spectrum of health research.	Pursue and secure partnerships with organizations in Canada that share common values and goals in the area of health research.	Formed multiple partnerships: from 265 agreements in 2003–2004 to 382 in 2009–2010.
4. Enhance public and stakeholder engagement in health research in Canada.	Engage in ongoing dialogue with the Canadian public and other stakeholders to heighten awareness of the significant role health research plays in improving the health of Canadians, the health system and the effectiveness of products and services.	Developed Public Engagement Strategy, including Cafés Scientifiques program across Canada.
	Involve the Canadian public and other stakeholders in priority-setting and appropriate research activities (e.g., peer review panels, forums of various institutes).	Added community members to many review panels, including citizen representation on Institute Advisory Boards. Increased use of merit review where both research peers and knowledge users evaluate applications.
5. Promote science to Canadian children and youth.	Create opportunities in collaboration with partners to engage children in science discovery (e.g., GEE in GENOME travelling exhibit, Discovery Days).	Launched Synapse youth outreach program.

Table 6: Blueprint achievements (cont'd)

Objective	Action	Achievement
Organizational Excellence		
1. Provide leadership and coordination in setting direction on important health research issues.	Ensure that CIHR's research agenda remains current through ongoing consultations with a broad range of stakeholders.	Established Leaders Forum where all sectors of research funders meet regularly. Established numerous institute-sponsored workshops and consensus processes for setting research agendas in targeted areas.
	Contribute to the development of innovative public policies related to ethical, legal and socio-cultural issues in health and health research.	CIHR Guidelines for Human Pluripotent Stem Cell Research 2002, updated 2007, and CIHR Stem Cell Oversight Committee 2003 provide framework and national oversight of human stem cell research. Completed work on policies for health research involving Aboriginal people and research misconduct. Initiated policies for research involving children and for relationships with the private sector.
2. Promote CIHR's research agenda and ensure that the needs of the scientific communities are effectively met.	Develop and implement processes designed to respond effectively to the needs of research communities representing the full spectrum of research.	Amended peer review process to eliminate possible disadvantage to non-biomedical applications following research on rating patterns of review committees.
	Promote institute research priorities at all levels of research, policy and practice in Canada and abroad.	Created Scientific Council, which allows direct input of institute priorities to CIHR decision making.
3. Build a committed, motivated and productive workforce across the organization.	Develop and implement a continuous learning environment within CIHR for all staff.	Required all staff to develop learning plans in collaboration with their managers.
	Develop and implement new job classification, evaluation and compensation systems that recognize performance.	Implemented all components.
	Develop and support a healthy work environment.	CIHR recognized as one of Canada's 100 top employers for 2010.
4. Improve overall organizational effectiveness through ongoing improvements in programs, structures and processes.	Develop and implement governance renewal processes and mechanisms to support excellence in governance.	Implemented routine mechanisms for institute director renewal and transition.

Table 6: Blueprint achievements (cont'd)

Objective	Action	Achievement
Organizational Excellence (cont'd)		
	Advance an institute-centered organization through effective alignment of programs, structures and processes with institute priorities and requirements.	Created Scientific Council, which places institutes at centre of CIHR decision making. The rationalization of competition timetable and complexity of funding opportunities increases visibility of strategic priorities.
	Develop and implement a framework that enables the evaluation of the organization's performance and the value of its programs of research support.	Substantially increased evaluation and analysis capacity and competence, with significant studies completed.
	Enhance the effectiveness of CIHR's peer review system.	Reduced time and cost factors in several areas, e.g., "at home" reviews for training awards. Introduced triage to eliminate uncompetitive applications.
	Develop and implement a risk management framework and mitigate priority risks.	Implemented risk management in accordance with federal directives.
	Advance modern management practices to ensure that CIHR meets Government of Canada objectives set out in Results for Canadians: A Management Framework for the Government of Canada.	Achieved full compliance with federal requirements for accountability and reporting results.
5. Capitalize on technology to enhance service delivery.	Continue to promote and support the implementation of electronic service delivery such as the CommonCV project.	CommonCV now used by 17 Canadian research agencies, including NSERC, SSHRC, Genome Canada, CFI.
	Support the roll-out of ResearchNet, a Canadian research portal that supports collaboration and information sharing among researchers, research organizations, government, industry and the public.	ResearchNet now used in major CIHR competitions.
	Leverage technology to improve the efficiency and effectiveness of business processes (e.g., peer review, website applications such as e-applications for funding).	Electronic submission of applications used in major competitions, including open operating grants.
	Enhance databases and information, including public access to information about CIHR's investments in research.	Refined CIHR's fully searchable public funding database.

Results of and responses to first International Review

CIHR's first International Review Panel (IRP) concluded that CIHR was meeting its mandate and all 13 institutes were working well. The IRP was impressed by the progress made in developing a more unified model of health research funding. The capacity to fund research across all health-related disciplines had clearly been enhanced and new strategic initiatives had strengthened multidisciplinary research and training. The IRP concluded that it was too early to make conclusive judgments as to the effectiveness of the CIHR model of health research funding. The report offered observations for CIHR to consider in the next stage of its evolution. These are listed below in italics, with CIHR's response. In some cases, the IRP's advice validated actions already in progress.

Governance and management

“Accountability and transparency need to be reinforced at all levels of the organization. Governing Council (GC) should consider its position as the main board of the organization and a single research committee should be established to account for all research expenditures.”

GC has clarified its strategic governance role and assumed the role of Board of Directors. It has delegated its responsibilities for scientific matters, including approval of funding awarded in CIHR's competitions, to a newly constituted Scientific Council. GC now concentrates on broad strategic direction setting and provides strategic advice.

“Rapid growth and the challenges associated with matrix management across the CIHR Institutes and Ottawa has created management challenges within CIHR leading to the conclusion that the executive team needs expanding and strengthening. The most appropriate structure for handling these issues should be considered after an organizational review.”

Two organizational reviews were conducted by external consultants and their recommendations have been implemented to strengthen the management team, with realigned responsibilities (Table 1).

“Scientific Directors (SD) should now be given further responsibility to oversee the panel/activity in their scientific area. It would also seem reasonable that a future role of SDs might be to form the core of the central committee replacing RPPC responsible for allocation of the whole research budget.”

SDs play an expanded leadership role through their membership on the Scientific Council, which is responsible for the expenditure of the budget approved by GC. SDs are also responsible for overseeing performance of the entire peer review system, though not for its actual operation, which is the responsibility of the Research Portfolio.

“The crucial leadership role played by the SDs led the IRP to consider the succession challenges associated with moving CIHR Institutes every five to seven years and believe this is a significant issue as institutional memory will be lost. Options should be considered for ensuring the smooth transition of the institutes.”

Turnover of SDs is now routine, and dedicated resources and processes facilitate the transition. The increased experience of Ottawa-based institute staff ensures continuity of institutional memory. The benefits of regular institute leadership renewal outweigh the inevitable disruptions.

Programs and peer review

“Rapid growth, particularly of new strategic initiatives and peer review panels, has led to excessive complexity. This complexity needs to be reduced to enable opportunities and activities to be both focused and manageable.”

The proliferation of funding programs has been costly with respect to peer review. For the 149 operating grant programs in operation in 2009–2010, review of applications involved 125 review committees. The Scientific Council has moved to reduce the number of strategic initiatives and focus on fewer, larger, multi-institute or pan-CIHR opportunities. It has adopted a critical, centralized approval system for strategic initiatives based on the number of institutes involved, scope, cost and duration.

“The peer review system that is responsible for handling most of the research funding is currently under strain and requires more academic leadership. A review of its processes and structure is necessary.”

Reform of the peer review system is one of the key deliverables of CIHR’s new strategic plan (Roadmap). Meanwhile, a streamlining process allows triage of uncompetitive the applications, enabling review committees to focus on those in contention.

“Since teams and collaborations often form unpredictably and in a more bottom-up approach in response to complex problems, CIHR should develop a flexible and responsive approach to promote multidisciplinary research.”

The largest and most flexible program is the Open Operating Grant Program, which has no limitations on number of applicants or requested grant size and, increasingly, “self-assembling” research teams are applying for funding through these competitions.

Knowledge translation

“There remains lack of clarity about the definition of knowledge translation (KT) across the organization.”

CIHR is now recognized as a leader among funding agencies in its approach to KT. “CIHR has taken a bold stand in leading the advancement of this agenda. Hopefully other funding agencies will follow suit”.³⁶ It has refined its definition of KT, making a distinction between “end of grant” KT, where information is disseminated to those who need to use it at the end of a research project, and “integrated” KT where the users of research knowledge are engaged in all phases of a research project, from formulating the research question to applying the findings. It has adopted the Knowledge to Action framework to guide its approach to KT.³⁷

To educate the research community about the concepts and practical processes of KT, CIHR commissioned the development of four KT learning modules,³⁸ produced a series of KT Casebooks,³⁹ and published the book, Knowledge Translation in Health Care, which provides the state of the theory and research evidence behind studying and doing KT.⁴⁰ CIHR also provides the majority of support for the work of the Cochrane Collaboration in Canada. Annual expenditures on grants and awards to support KT rose from \$350,000 in 2001–2002 to \$18.2 million in 2009–2010.

An important recent KT development is CIHR’s Evidence on Tap program, designed to engage federal, provincial and territorial ministries of health by meeting their need to inform policy making with research evidence. This program brings together in Best Brains Exchanges CIHR-funded researchers and policy makers to discuss in confidence the evidence about the particular health issues on which a ministry is seeking advice. At the request of ministries, CIHR also funds research teams to provide expedited knowledge synthesis of the evidence in areas of interest. The Evidence on Tap program has been warmly received by policy makers: “Now you hear the Deputy Minister talk about CIHR all the time. He talks about Best Brains and says that what we’re trying to do is accomplish fundamental change and that CIHR, with the Best Brains, is helping us to achieve this.”⁴¹

Since CIHR’s Institutes are strongly linked to the researcher and knowledge user communities, they play a critical role in promoting and facilitating the dissemination and application of CIHR research results. Increasingly, the institutes have embraced their role in supporting and promoting researchers’ KT efforts as well as evolving their own role as knowledge brokers. To guide their individual approaches, institutes now include KT activities as integral parts of their strategic plans.

“More attention should be directed at providing leadership in the area of technology commercialization.”

The introduction of the Tri-Council Centres for Excellence in Commercialization of Research and the business-led Networks of Centres of Excellence have boosted CIHR's spend on commercialization activity. Nevertheless, challenges remain. In the latest fiscal year, CIHR investments in the Proof of Principle program decreased significantly (Figure 19). This program requires matching contributions from industry, reflecting the difficulties Canadian industry is facing in acquiring venture capital for research and development, and the relatively low and decreasing "big pharma" R&D investment in Canada (Figure 20). To overcome these challenges, CIHR has appointed a Commercialization Advisory Committee, which includes experts in commercialization, technology transfer, the biotechnology and pharmaceutical industries, and company management. The committee has helped to redesign CIHR's commercialization funding opportunities to improve outcomes in these difficult economic times.

Figure 19: CIHR spending on commercialization programs

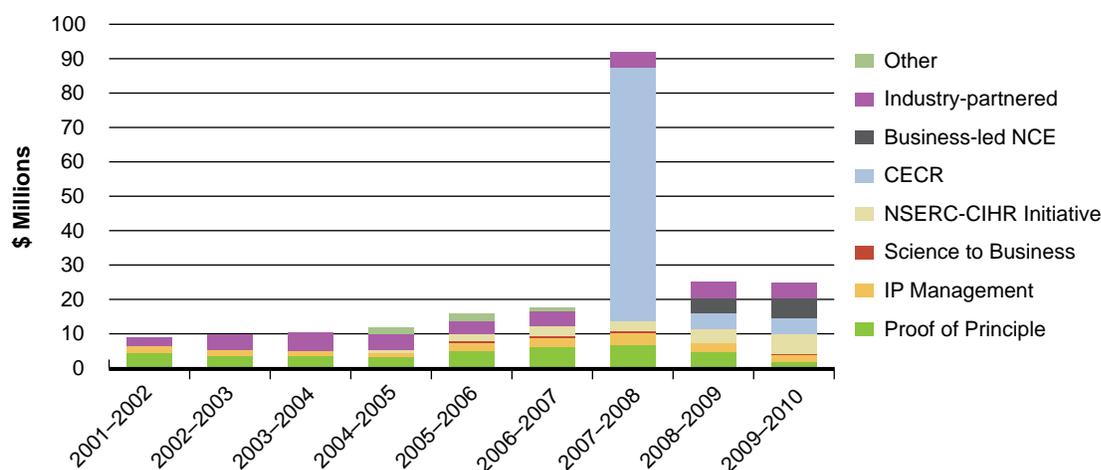
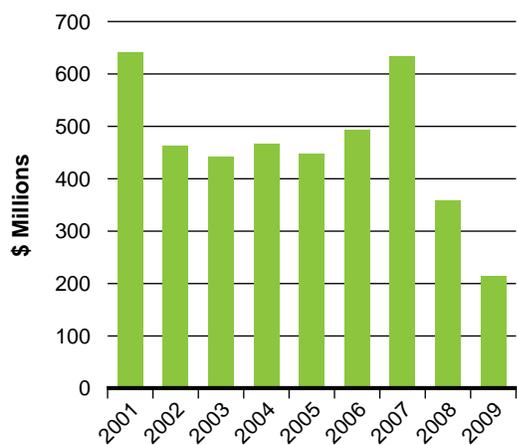
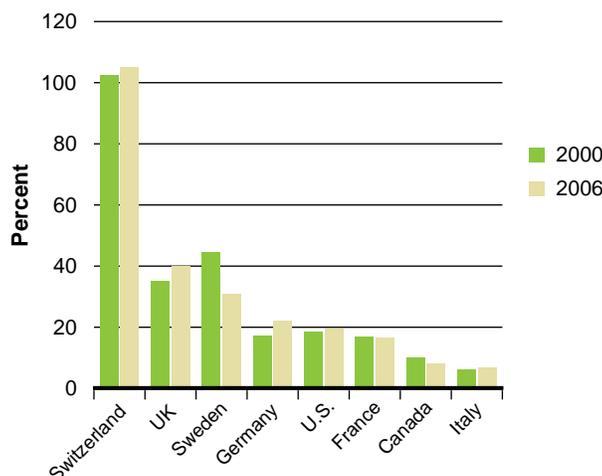


Figure 20A: Venture capital investments in the life sciences in Canada



A: Data from Annual Statistical Reports of Canada's Venture Capital and Private Equity Association

Figure 20B: R&D to sales ratio, Canada and seven comparator countries



B: Amended from Figure 23, Patented Medicine Prices Review Board 2008 Annual Report

Ethics

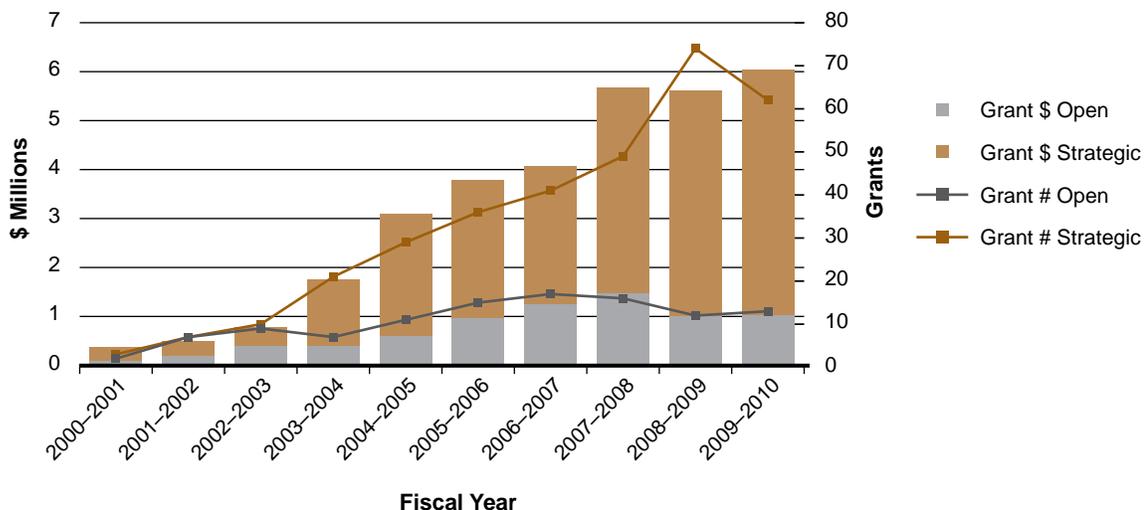
“CIHR should increase its emphasis on research in ethics as well as its governance responsibilities that ensure that the research that it funds meets the highest ethical standards.”

There have been major developments in both research on ethics, and ethical standards in health research, as advised by the IRP. The ethics function at CIHR consists of the Standing Committee on Ethics to advise GC, the Ethics Office to lead and coordinate CIHR’s mandate in ethics and ethics designates on all Institute Advisory Boards to provide advice to institutes. The Ethics Office also supports GC’s Stem Cell Oversight Committee, which reviews all research involving human pluripotent stem cells to determine its conformity to the CIHR Stem Cell Research Guidelines; and the Research Integrity Committee, which considers allegations of non-compliance with Tri-Council policies.

Important achievements of the Ethics Office include:

- publishing Guidelines for Health Research Involving Aboriginal Peoples (2007), which informed Chapter 9 of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS)
- providing major input into the TCPS 2nd Edition in areas of health research
- influencing and contributing to the development of the Tri-Council process for addressing allegations of non-compliance with Tri-Council policies (2009)
- developing Best Practices for Research Involving Children and Adolescents (fall 2010); and an ethical framework for Partnerships with the Private Sector (fall 2010)

Figure 21: Number and value of ethics grants



Through its strategic funding envelope of \$2 million per year (which supplements the support available through CIHR's open funding competitions), the Ethics Office has been building capacity and supporting the existing research community. Figure 21 shows that CIHR now invests more than \$6 million per year in 75 ethics-related grants. A further \$1 million supports 33 training and salary awards.

A first Ethics strategic plan for 2010–2015 was developed in alignment with the CIHR Roadmap.

Evaluation

“End-of-grant reports provide an important mechanism in accumulating data on achievements that can be used for future evaluations. There are standard metrics in all (research) settings and more effort needs to be invested in ensuring that these are collected and analyzed to plot the relative success of the organization. This process needs to be addressed immediately so that information is available to assess CIHR objectively on its performance.”

Resources and expertise for program evaluation have increased. CIHR has adopted a modified “payback” framework for capturing the value of investments in health research, similar to that proposed by the Canadian Academies of Health Sciences⁴² and focusing on advancing knowledge, research capacity building, informing decision making, health impacts and broad economic and social impacts. A five-year rolling evaluation plan is published each year.⁴³ Programs evaluated to date include the Training Programs, Canada Graduate Scholarships and Networks of Centres of Excellence (the latter two in collaboration with the other granting agencies). Studies on the outcomes from Open Operating Grants and Salary programs are in progress. The institutes have evaluated many of their most important research initiatives and this information is found in their individual reports.

A Research Reporting System captures information on the outputs and outcomes from all CIHR-funded research within 18 months of the end of the funding period.

Communications

“Communication remains an important and challenging activity for the CIHR, particularly the range of potential audiences, including funding partners, provincial and federal governments, universities, health researchers, international agencies and the citizens of Canada. CIHR management needs to consider creative approaches to the utilization of a wide range of communication sources and resources including effective use of electronic and web-based dissemination, and should continue to improve its communication with key stakeholders.”

Communications and Public Outreach targets the media through press releases, expert alerts, ministerial announcements, a monthly e-newsletter to journalists and short profiles about CIHR-funded researchers. There has been an eight-fold increase in the number of media mentions of CIHR since the 2006 IRP report: from 561 in 2005–2006 to 4,363 in 2009–2010. To raise CIHR’s profile among journalists and promote excellence in Canadian health journalism, the CIHR Journalism Awards and journalist workshops were instituted. CIHR regularly communicates the results and impacts of CIHR investments in health research with Members of Parliament. Each fall, CIHR holds the Canadian Health Research Awards, recognizing health research excellence. This event receives widespread publicity. CIHR engages members of the public directly through Cafés Scientifiques – informal interactions between the public and experts on a health issue, held at a café, pub or restaurant. CIHR held 104 Cafés across the country in 2009.

To connect health researchers with youth, CIHR developed its Synapse program⁴⁴ with the result that in 2008–2009, 5,300 CIHR mentors devoted 27,300 hours of their time to educate 112,800 Canadian youth about the merits of science and health research. CIHR’s successful social media presence has expanded in the past year, with English and French Facebook pages⁴⁵ that already have more than 40,000 fans. In December 2008, CIHR launched a fully redesigned website with client-centric information architecture, and a consistent presentation of the institutes, each of which publishes newsletters about research opportunities and achievements that are of special interest to its research and partner community.

Canada’s research landscape

“A major outstanding challenge for the CIHR and health research in Canada is the apparent lack of co-ordination at the federal and provincial levels of the many different types and sources for funding for different aspects of health research. Support for infrastructure and research posts are welcome but must be aligned with the operating grants that are necessary to keep the research enterprise running.”

Since the first International Review, all federal research agencies, including CIHR, have strengthened their collaboration. This collaboration operates at multiple levels, including joint programs, administrative structures and funding policies. Presidents of the Natural Sciences and Engineering Research Council, the Social Sciences and Humanities Research Council, CIHR, and the Canada Foundation for Innovation meet every three to six weeks to discuss issues of common concern, advance joint initiatives and explore strategic issues. Vice-presidents also meet on a regular basis to follow up on issues raised by the presidents, as well as to initiate and contribute to collaborative activities. An example of the outcomes of such meetings is the Institute of Population and Public Health-led International Research Initiative on Adaptation to Climate Change,⁴⁶ which also involves the International Development Research Centre, and supports the formation of multinational teams from Canada and low- and middle-income countries.

In addition, CIHR has strengthened its ties with the National Research Council (NRC) and Genome Canada. In 2008, CIHR and Genome Canada initiated major national and international collaborations such as the Canada–California partnership on Cancer Stem Cells (see below) and, more recently, a partnered program called Advancing Technology Innovation through Discovery that links next-generation sequencing technologies with gene discovery projects on childhood diseases.

Despite this broadened dialogue, the complex balance of funding among highly qualified personnel, infrastructure and maintenance and operating support – an issue that largely lies with budgetary decisions by the federal government – has remained a challenge.

Part 5: The Way Forward

The implementation of Roadmap, CIHR’s new five-year strategic plan

In 2009, CIHR’s Governing Council approved CIHR’s second strategic plan (2009–2014) The Health Research Roadmap: Creating Innovative Research for Better Health and Health Care. This strategic plan is the product of widespread consultations with members of the health research community, careful assessment of CIHR’s strengths and weaknesses, and ongoing deliberation about what CIHR would like to achieve by 2014. Roadmap sets out a vision to secure Canada’s place on the world stage of health research for years to come. This vision includes four strategic directions.

Figure 22: CIHR’s Roadmap strategic plan



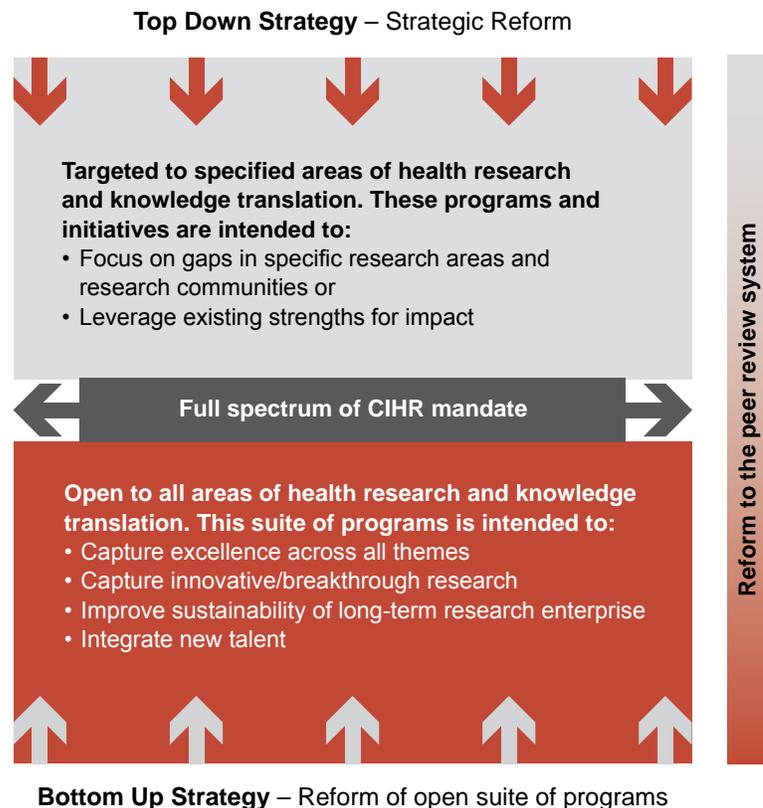
A rolling, three-year implementation plan has been developed for Roadmap. The implementation plan highlights activities CIHR will undertake over the next three years to implement the strategic plan. It also outlines some of the key results achieved in fiscal 2009–2010.

In January 2010, CIHR established the Roadmap Implementation Office. Its purpose is to support CIHR leadership in implementing the CIHR strategic plan, including the three reforms outlined below. The office is intended as a centre of expertise for implementation planning and change management. It provides Scientific Council and the Executive Management Committee with an integration and coordination point for all Roadmap implementation activities. It also provides implementation leads with proven methods to manage risk and change.

Reforms

To achieve its strategic directions, CIHR has identified three major reforms. These reforms will significantly affect the way CIHR achieves its mandate. They include reforms to CIHR’s open suite of programs, the peer review system and the strategic investment process. The interrelationship between the reforms is depicted below.

Figure 23: Inter-relationship of proposed reforms to achieve CIHR’s strategic direction



Reform of the peer review system

CIHR's success at supporting excellence in health research depends on the quality of its peer review system. The first International Review Panel (IRP) noted the fatigue in an overworked system and, during the President's recent cross-country tour, many researchers voiced concerns about the uneven quality of the review process. There is also a chronic problem recruiting committee members, in part due to lack of recognition for this vital service. CIHR is embarking on peer review reform that ensures all applications are evaluated with the same degree of rigour and fairness irrespective of research area or methodology, that adapts as research evolves and that makes optimal use of our most precious asset: the peers.

This reform is founded on the establishment of a College of Reviewers. The college will comprise accomplished Canadian and international researchers with expertise across the full spectrum of CIHR's mandate, including knowledge users who can help judge the impact of research proposals. An invitation to join the college will be a mark of prestige, and acknowledged as such by CIHR and research institutions. College members will be supported by training, performance measurement and recognition programs. The college will enable a peer review system that is nimble and responsive to the varying nature of applications submitted to CIHR and sufficiently flexible to respond to the ever-changing nature of research. Furthermore, the college will reflect the recognition that a healthy, well-functioning, high-quality peer review system results from a collective effort where applicants, reviewers, funders, institutions and partners all contribute and benefit.

Reform of the open suite of programs

CIHR has a suite of open funding programs, open to all areas of health research and knowledge translation. Over the years several challenges have arisen, including an increasing number of applications and declining success rates in competitions for these grants, leading to wasted resources in applying for and peer reviewing them. In this context, four other challenges have arisen:

1. Supporting truly innovative but risky proposals that are not backed by large amounts of preliminary data
2. Giving talented and well-trained young investigators the chance to break into CIHR funding
3. Supporting established, productive and creative investigators at a level that sustains their groundbreaking research programs
4. Capturing excellence across all four themes of health research

The objective of reforming the open suite of programs is to design a core, stable suite of programs that can capture existing strength, capture ideas generated by an unrestricted applicant pool (individuals or teams), invite ideas across the full spectrum of health research to compete for funding, and rely on market forces to generate new ideas and new projects.

Reform of the process for strategic investments

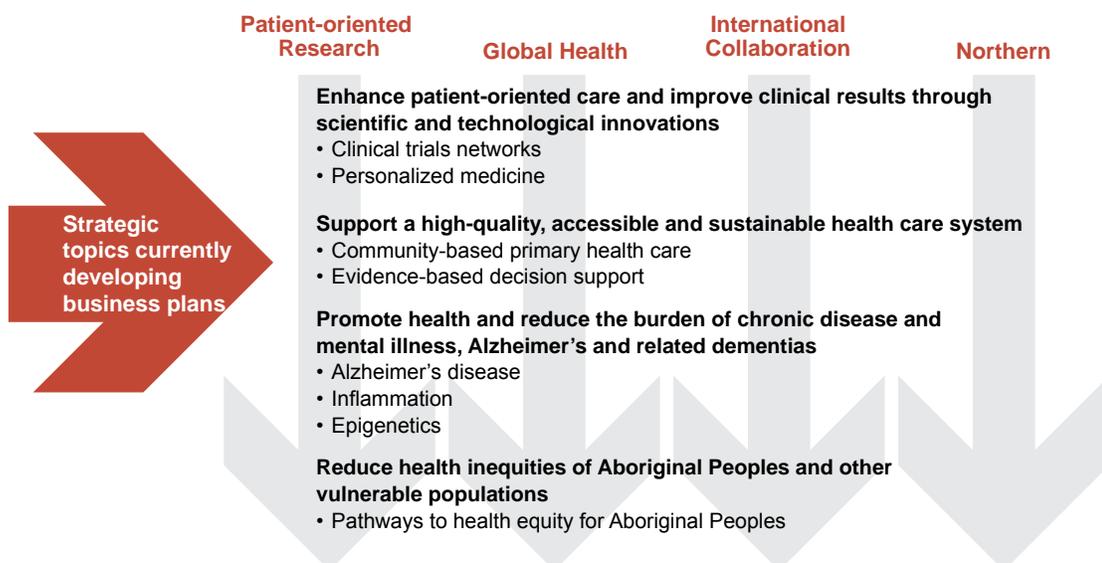
In addition to the suite of open funding programs, CIHR also targets investments to address gaps in specific research areas or research communities and to leverage areas of strength in Canada. Over the years, several challenges have arisen, including the support of a large number of initiatives, which have limited the investment dollars available to each initiative. This reform responds to feedback from CIHR's community for fewer, more targeted initiatives, the objective also being to attain greater focus in the use of strategic investments. CIHR's targeted initiatives also need to work seamlessly with the new, integrated open suite of programs described above to ensure excellence and relieve the pressure on peer review. As part of the reform, a new annual process has been established recently to identify and plan targeted initiatives. The process is intended to concentrate limited resources on fewer better-funded initiatives, simplify the interface with CIHR for its partners and the research community and encourage multiple institutes and other branches across CIHR to collaborate on delivering strategic priorities.

This annual process starts with a scan of priority areas that outlines the level of investment in open and strategic programs and assesses the strengths, gaps and opportunities. This scan is carried out with input from all the institutes and their Institute Advisory Boards (IAB). Using the results of this scan, Scientific Council holds a priority-setting session. Once the target areas for investment are identified, a select number of concept papers that briefly outline key strategic initiatives are developed for review and approval by Scientific Council. The concept papers that are approved are then developed into business cases for funding decisions.

Enabling strategies

In addition to specific strategic initiatives, there are a number of strategies under development that can be thought of as enabling the overall research priorities of Roadmap. The diagram below shows the relationship between the research priorities and these strategies.

Figure 24: Current enabling strategies



Patient-oriented research strategy

This strategy was developed in response to a need for the Canadian health care system to embrace innovation and thus ensure sustainability and cost effectiveness.⁴⁷ Canada has significant strengths in this area, including a high-quality health care system and research environment, a unique competence in systematic reviews, a record of research breakthroughs and high-impact clinical studies and population-based administrative databases as a basis for research.

The elements of the strategy are:

- Improve Research Environment and Infrastructure. Support for People and Patient-Oriented Research and Trials (SUPPORT) units will offer core research services to a region's health system by supporting patient-oriented researchers and programs; educating and supporting health care professionals interested in evaluating the quality, accessibility and cost-effectiveness of care, and developing new research programs; and implementing optimum standards for research involving human participants. In addition, research networks will be assembled to link SUPPORT units nationally across thematic areas such as mental health, primary health care and chronic disease management.
- Set up mechanisms to train health professionals and non-clinicians in the core methods of clinical research and provide training for clinical epidemiologists, biostatisticians, methodologists and health economists, as well as research coordinators and project managers.
- Strengthen organizational, regulatory and financial support for multi-site studies, and eliminate systemic barriers to patient-oriented research, such as the significant delays created by complex multicentre ethics review processes.
- Support best practices in health care through collaboration between guideline developers and health care professionals. This will promote the development of high-quality, evidence-informed practice guidelines, and encourage policy makers, institutions, health care professionals and consumers to adopt them.

A critical issue in this strategy is the recruitment and retention of clinician-investigators in the face of economic and lifestyle disincentives. While the number of PhDs receiving CIHR salary support grew by 245 between 2004–2005 and 2008–2009, the number of health professionals grew by only eight. Although meeting this challenge is a commitment of Roadmap, it cannot be met by CIHR alone and will require investment from the provinces. In fact, the entire strategy will succeed only if provincial governments are engaged as equal funding partners and are prepared to put into practice the emerging research findings. This strategy is particularly timely because the pending adoption of electronic health records across the provincial health care systems is an opportunity to integrate them with databases of incomparable utility for health services and population health research.

Global Health Research Strategy

In partnership with the Canadian International Development Agency, Health Canada, the International Development Research Centre (IDRC) and the Public Health Agency of Canada, CIHR, led by the Institute of Population and Public Health (IPPH), has participated in the Global Health Research Initiative since 2001, spending more than \$52 million in building collaborations between Canadian and low- and middle-income country researchers. A partnership with Grand Challenges Canada⁴⁸ and IDRC has seen CIHR join the Grand Challenges Board and provide peer review for the allocation of \$225 million in federal funding over five years. This allocation is directed to five grand challenges, the first of which will create a new class of easy-to-use, low cost, point-of-care diagnostics. CIHR is one of six national research agencies⁴⁹ that in June 2009 established the Global Alliance for Chronic Disease⁵⁰ to fight chronic, non-communicable diseases by collectively developing a research base, as well as to develop and share best practices. Lowering hypertension, reducing tobacco use and indoor air pollution were chosen as initial priorities. In 2005, CIHR partnered with the Gates Foundation to support three Canadian teams that were successful in the Grand Challenges in Global Health Initiative competition, and a recently signed memorandum of understanding between the two agencies defines a framework for collaboration from 2010 to 2015.

The CIHR global health research strategy of January 2010 focuses on integrating global health into the activities of all institutes and programs, with a suggested focus on primary health care and strengthening health care systems. CIHR will seek national and international partnerships that enable it to have greater impact in pursuing global health goals that align with Roadmap priorities.

International Collaborative Research Strategy

Health research is increasingly performed by multidisciplinary, multi-investigator teams, often crossing the traditional boundaries of the Tri-Council. Therefore, CIHR must increasingly partner with other national and international funding agencies that share a common vision or set of priorities. Scientific Council has requested a strategy to provide guidance to institutes so they choose wisely among limitless opportunities for international collaboration. The following are current examples of international initiatives.

CIHR's International Collaborative Research Strategy for Alzheimer's Disease

This initiative is focused on risk factor identification, early diagnosis, early intervention and prevention of dementia. It will support translational, patient-oriented and health systems research that will in turn support a sustainable health care system for individuals with dementia. CIHR is a partner in the U.S. National Institutes of Health-led Alzheimer's Disease Neuroimaging Initiative and provides financial support to the five Canadian sites. A funding partnership between CIHR, the Fonds de la recherche en santé, and the Agence Nationale pour la Recherche in France has

operated since 2009. The German Centre for Neurodegenerative Diseases and the UK Medical Research Council have recently signed a cooperation agreement with CIHR to establish and apply harmonized guidelines and technologies for research on neurodegenerative diseases. A joint memorandum of understanding between CIHR and the National Natural Science Foundation of China is under development to support collaborative studies on the involvement of cerebral microvasculature in the pathogenesis of Alzheimer's disease.

The Structural Genomics Consortium

This initiative is a public-private partnership that determines and publishes in the public domain ~150 3-D structures of proteins of biomedical importance each year. It operates out of the Universities of Toronto and Oxford and the Karolinska Institute. In addition to CIHR, it is funded by 12 other Canadian, UK and Swedish agencies, GlaxoSmithKline GSK, Merck and Novartis.

The Cancer Stem Cell Consortium

This consortium is composed of CIHR, Genome Canada, the Canada Foundation for Innovation, the Ontario Institute for Cancer Research, the Stem Cell Network, the National Research Council and the BC Michael Smith Foundation for Health Research. It is joining with the California Institute for Regenerative Medicine to fund multidisciplinary teams focused on cancer stem cell-based therapy.

Northern Research Strategy

This aligns with the Roadmap priority of decreasing health inequities in Aboriginal Peoples and other vulnerable populations. The health of northern peoples, particularly Indigenous inhabitants, is compromised by geography, lack of infrastructure and human resources, environmental and climate change issues, and cultural and social disconnection. As a result, the people of the Canadian North, particularly the Indigenous citizens, have the most compromised health in Canada. The strategy, led by the Institute of Aboriginal Peoples' Health, will address knowledge gaps in three areas: access to health care in remote communities; climate change, food security and health; and the unique health challenges faced by First Nations, Métis and Inuit populations. CIHR hopes to involve Health Canada and the Department of Indian and Northern Affairs as partners, along with the three territorial governments and the provinces of Quebec and Newfoundland and Labrador. Collaborations with other circumpolar nations will build on the momentum established by the 2007–2009 International Polar Year and the 2009 International Congress on Circumpolar Health, held in Canada.

Future challenges

Supporting big science and research infrastructure

Increasingly, problems in the life and health sciences are being addressed through large, multinational research consortia such as the Human Genome Project, the SNP Consortium, and the International HapMap Project. These approaches challenge the traditional small-team, hypothesis-driven, experimental approach to biomedical science and may be resented by those who fear they will divert funds that could be invested in conventional operating grants. On the other hand, many of these consortia have been successful; membership in them keeps Canadian researchers at the forefront of the field and provides early access to improved technologies. For CIHR, which has an obligation to support a broad base of investigator-initiated research across Canada, a decision to invest significant funding in such “big science” consortia at a time of low budget growth is especially difficult, and Scientific Council has a regular process for reaching timely decisions on such opportunities.

CIHR is funding two large population cohort studies:

- **The Canadian Healthy Infant Longitudinal Development (CHILD) Study**⁵¹ is a study of 5,000 children born across Canada who will be followed from pregnancy until five years of age. The study will examine the influences of indoor air quality and its effect on the risk of asthma and allergies. The study is co-supported by the Allergy, Genes and Environment NCE.
- **The Canadian Longitudinal Study on Aging (CLSA)**,⁵² initiated by the Institute of Aging, and now a major CIHR initiative, will follow 50,000 Canadians aged 45 to 85 for at least 20 years to understand how changing biological, medical, psychological, social and economic factors impact health and disability as people age. The CLSA is linked to other cohort studies around the world; it is essential that studies supported by CIHR provide unique information and contribute to international collaborative efforts. The study’s first five-year implementation phase is underway, supported by \$50 million from CIHR, the Canada Foundation for Innovation and several provinces. An international oversight committee is monitoring progress and will advise CIHR on renewal funding.

CFI has transformed Canadian research institutions, enabling them to acquire state-of-the-art equipment and facilities. However, the foundation provides funds only for operation and maintenance of the equipment equivalent to 12% of the capital cost. Operating and maintaining the growing inventory of CFI-funded equipment to the end of its life-cycle is a growing challenge for research institutions, which look to CIHR for assistance.

Promoting and supporting data sharing and access

CIHR's Policy on Access to Research Outputs, which came into effect January 1, 2008, requires that all research papers generated from CIHR-funded projects be freely accessible through the publisher's website or an online repository within six months of publication. To complement the policy, CIHR, the National Research Council and the U.S. National Library of Medicine created PubMed Central Canada,⁵³ where CIHR-funded researchers can deposit their peer reviewed research publications.

CIHR has established, in collaboration with Health Canada, the Drug Safety and Effectiveness Network,⁵⁴ which will provide information on the safety and effectiveness of pharmaceuticals when used by diverse patient populations outside the controlled experimental environment of clinical trials. This endeavour is supported by \$36 million over five years from the Government of Canada.

Access to provincially based administrative health data for research purposes is difficult: there are varying federal and provincial laws and regulations concerning privacy and consent. The Drug Safety and Effectiveness Network is working to establish a Canada-wide collaborating centre to access relevant administrative data. Given the recognition of drug safety and effectiveness as an essential element of protecting the health of the public, it is anticipated that access to administrative data for this purpose will be viewed more favourably by provincial governments than if it were intended only for investigator-driven research.

CIHR is involved with Genome Canada in efforts to establish the National Data Harmonization Platform, which would allow the pooling or the comparison of data-sets from CIHR-funded and other Canadian cohort studies. CIHR is also supporting international efforts to promote data sharing.⁵⁵

Developing and evaluating multidisciplinary research teams

CIHR encourages multidisciplinary team approaches to research on complex health issues, but the formation, maintenance and evaluation of such teams has proven challenging. Formative evaluations have emphasized the creativity that emerges from such teams, the rich experiences for trainees and the advantages they have for KT. However, they have also underlined the difficulties experienced when researchers from different disciplines work together. It takes about two years before new teams run smoothly, meaning the standard, normal, non-renewable five years of funding for new teams may be too short to yield maximum impact from the team's efforts. Other issues include ensuring that multidisciplinary applications for funding are expertly and comprehensively reviewed and establishing individual credit for team accomplishments.

The institutes are facilitating the work of multidisciplinary teams by providing more advice and training to the leaders and participants, and many now bring funded teams together for workshops at the start and at intervals during the duration of funding. This enables teams to discuss their successes and challenges and learn from each other.

Improving commercialization and relationships with the private sector

Given the adverse economic conditions for research investment by the life sciences industry, it will be especially challenging for CIHR to achieve the Roadmap goal of increased commercialization of health research. With the assistance of its Commercialization Advisory Committee, CIHR will put more effort into establishing liaisons with companies and exploring the advantages of participation in CIHR's matching research programs. These may need to be redesigned to better serve the current needs of industry and the venture capital community. University technology transfer offices, the gatekeepers to intellectual property developed by CIHR grant holders, will also have to be engaged in these discussions and supportive of changes.

Finding new approaches to drug development

Inefficiencies, duplication and a high failure rate characterize the current system of drug discovery. It has been argued that “clinical proof-of-concept studies for selected targets should no longer be considered as a step on the path to commercialization, but rather as a precompetitive scientific experiment whose output can therefore be made available to all, without restriction on use,”⁵⁶ leading to a proposal for an academic–industry consortium that would develop clinical probes of validated efficacy in humans for a wide array of potential targets. A public-private partnership model for the funding and development of innovative, precompetitive research activities already exists in the Quebec Consortium for Drug Discovery.⁵⁷ Extending this model to a nationally-based consortium involving other organizations, such as the Centre for Drug Research and Development in Vancouver and MaRS Innovation in Toronto, would harness collective Canadian expertise and make Canada more attractive to international pharmaceutical investment.

Increased pressure for CIHR funding

A welcome federal investment in personnel, training and infrastructure increases the demand for operating funds from CIHR. A 2007 study forecast increased funding pressure on CIHR equivalent to \$400 million by 2010 due to these additional investments in health research.⁵⁸ The proportion of federal funding that supports the operating costs of research has fallen from almost 70% in 1997–1998 to less than 50% in 2007–2008. Two changes will further increase the pressure on applications to CIHR. First, the Canadian Health Services Research Foundation is moving away from research granting and may expend its endowment over the next few years. Second, the Social Sciences and Humanities Research Council (SSHRC) announced in May 2010 that it would exclude research that is primarily intended to improve health, health services and products or the Canadian health care system. In 2008–2009, SSHRC was supporting 330 health-relevant grants and awards. Many of these researchers will now look to CIHR for support.

Conclusion

CIHR's first 10 years were highly creative, characterized by a variety of novel approaches and funding mechanisms and sustained by unprecedented budgetary growth. The challenge ahead will be to sustain the organization's dynamism and creativity in the period of budgetary restraint that is likely to stem from the current economic downturn.

In its Roadmap for 2009–2014, CIHR has applied learning from its first 10 years and kept the spirit of imagination and innovation while attempting to reduce some of the complexity that had arisen from its rapid growth. It will focus its research priorities, simplify its program offerings, reform its peer review system, reduce the number of small initiatives, and emphasize ambitious, multi-institute and partnered initiatives. These ambitious new research initiatives will require closer collaboration among institutes, increased buy-in from public and private partners and larger involvement of health research users. These actions, in turn, will require increased openness (particularly towards the provinces) and greater nimbleness on the part of CIHR.

CIHR will continue to insist on scientific excellence and potential for impact in all the research that it funds. It will support the training and career development of the next generation of researchers. Through increased interaction with health professionals, health system managers and policy makers, CIHR will prove the value that health research holds in prevention, diagnosis and treatment, in sustaining and improving a high-quality and affordable health care system, and in developing public policy informed by evidence. It will assist in the transfer of discoveries with commercial potential from invention to industrial development. Through improved reporting on the outcomes and impacts of its funding, CIHR will convince Canadians of the economic and social value of continuing investment in health research. The guidance of the second International Review Panel will be vital to CIHR's success over the next challenging but exciting five years.

List of Acronyms and Abbreviations

List of Institutes	
IAPH	Institute of Aboriginal Peoples' Health
IA	Institute of Aging
ICR	Institute of Cancer Research
ICRH	Institute of Circulatory and Respiratory Health
IGH	Institute of Gender and Health
IG	Institute of Genetics
IHSPR	Institute of Health Services and Policy Research
IHDCYH	Institute of Human Development, Child and Youth Health
III	Institute of Infection and Immunity
IMHA	Institute of Musculoskeletal Health and Arthritis
INMHA	Institute of Neurosciences, Mental Health and Addiction
INMD	Institute of Nutrition, Metabolism and Diabetes
IPPH	Institute of Population and Public Health
Report specific	
CECR	Centres of Excellence for Commercialization of Research
CERC	Canada Excellence Research Chairs
CHSRF	Canadian Health Services Research Foundation
CIHR	Canadian Institutes of Health Research
CFI	Canada Foundation for Innovation
CRC	Canada Research Chairs
FRSQ	Fonds de la recherche en santé du Québec
GC	Governing Council
GDP	Gross Domestic Product
IAB	Institute Advisory Board
IC	Industry Canada
IDRC	International Development Research Centre
IRP	International Review Panel
KT	knowledge translation
MOU	memorandum of understanding
MRC	Medical Research Council of Canada
NCE	Networks of Centres of Excellence
NIH	National Institutes of Health
NSERC	Natural Sciences and Engineering Research Council
OECD	Organisation for Economic Co-operation and Development
PA	Priority Announcement
PDF	Postdoctoral fellow
R&D	Research and development
RCT	Randomized controlled trial
S&T	Science and Technology
SD	Scientific Director of a CIHR Institute
SPOR	Strategy on Patient-Oriented Research
SSHRC	Social Sciences and Humanities Research Council

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