

CANCER RESEARCH ON THE AGENDA

Report on the national funding strategy for cultivating excellence

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Top-line summary

Activities of healthcare funding agencies are coming under increasing scrutiny due to the combined pressures of strained budgets and urgent calls to address patient needs — now and in the near future. To help support and spur a warming national cancer research climate, the Institute for Cancer Research, a core component of the Canadian Institutes of Health Research, has been developing strategic research priorities. This report outlines the processes and rationales that govern allocation of funding and accounts for the sums recently committed to specific projects.

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The Canadian Institutes of Health Research (CIHR),¹ formed in June 2000, has a broad mandate to foster research relating to the 4 pillars of health research: basic, clinical, health services and policy, and the health of populations.

VISION AND PARTNERSHIP

The CIHR's vision is to position Canada as a world leader in the creation and application of knowledge gained through health research. The aim is to benefit not only Canadians, but also the global community. Building on the base of excellent investigator-initiated research that was the hallmark of its predecessor, the Medical Research Council (MRC), CIHR promotes first-rate multidisciplinary, cross-pillar research while actively encouraging partnership and collaboration among academic, government, industry and voluntary organizations.

Led by inaugural President Alan Bernstein, an Ottawa-based staff of more than 300 manages the CIHR organization and maintains its programs with a total budget of more than \$620 million for 2003–2004 — an amount more than double that of 1999. As its budget grows towards an expected \$1 billion per year, CIHR recognizes the importance of investigator-initiated research through its operating grant programs and salary awards, anticipating a final balance of 70:30 between investigator-initiated research selected in open competitions and strategic research generated primarily by CIHR Institutes.

The Institute of Cancer Research (ICR) is one of 13 virtual Institutes that embody CIHR (**Figure 1**). These were created to address research needs within specific areas of human health by:

- identifying strategic research priorities
- promoting innovative multidisciplinary research
- developing targeted research initiatives
- ensuring uptake of evidence-based results

One example of the latter is the Translational Acceleration Grants Program for Breast Cancer Control, designed to

accelerate the application of basic breast cancer research findings into practice. This program is a partnership between ICR, the Canadian Breast Cancer Research Alliance (CBCRA) and the CIHR Institute of Gender and Health. Each Institute actively pursues partnership opportunities to synchronize its approach. CIHR Institutes frequently act as catalysts to form large-scale multi-partnered initiatives that have a real impact on the outcomes of health research.

A Scientific Director heads each Institute, supported by a small core staff and an advisory board drawn from the research community, stakeholder groups and the lay public. The 17-member ICR Institute Advisory Board (IAB) offers advice and direction to the Scientific Director. Regular meetings of the IAB are held at different locations across the country to provide opportunities for interaction with local research communities, representatives of government agencies, voluntary organizations and regional politicians. ICR's strategic research funding complements and strengthens the strong base of CIHR-funded investigator-initiated cancer research that occurs through the regular operating grants competition.

CANCER RESEARCH FUNDING

As Canada's premier funding agency for health research, CIHR invested more than \$79 million in cancer research in 2002–2003, a significant increase over previous years' commitments (**Figure 2**).

What the statistics say

An estimated 139,900 Canadians were diagnosed with cancer in 2003, and 67,400 died from it — making cancer the leading cause of premature death.

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At some point in their lifetimes, 38% of Canadian women and 41% of Canadian men are likely to develop cancer.² There are obvious mitigating factors: incidence could conceivably be halved if people stopped smoking, avoided excessive sun exposure, maintained optimum body weight and adopted healthier lifestyles, including adequate physical activity and appropriate food choices. Smoking cessation alone would reduce cancer by an estimated 30%, mostly through a reduction in lung cancer.² Encouragingly, overall incidence and death rates from cancer have either stabilized or decreased over the last 15 years, indicating that better understanding of the disease is beginning to have an impact on prevention, diagnosis and treatment.²

Selecting research priorities

Formation of the Canadian Strategy for Cancer Control (CSCC) in 1999 heralded a new process for coordinating Canadian cancer research. CSCC covers all aspects of cancer, with research being just one component. A working group meeting headed by Dr. Victor Ling produced a report with multiple recommendations for a Canadian research agenda.³ In response, representatives from the National Cancer Institute of Canada (NCIC), the Canadian Association of Provincial Cancer Agencies (CAPCA), Health Canada and ICR formed a Research Alliance mandated

with the task of identifying cancer research priorities. A Research Action Group, under the chairmanship of the Scientific Director of ICR, Dr. Philip Branton, was formed and includes all the members of the Alliance, plus representatives from other major organizations that fund cancer research, members of the lay/survivor community and researchers from the 4 CIHR pillars of health research. This structure aims to consolidate links between Canada's major cancer research agencies and organizations, advancing development of a national research agenda.

In 2001, a meeting of a large Research Alliance-sponsored working group, followed by a web-based Delphi process, identified 12 main themes and a subset of infrastructure/capacity needs. A list of 24 priority areas was compiled by taking the top 2 priorities from each of the 12 themes. The ICR Advisory Board and representatives from NCIC, CAPCA and Health Canada voted in May 2002 to select the top 6 as ICR research priorities (Table 1). A multidisciplinary Working Group, including representatives from potential partner organizations, was created for each priority, chaired or co-chaired by IAB members with relevant expertise.

Each CIHR Institute has a budget of \$1 million per year for operating and development costs and also an additional strategic research budget. As the financial

support for CIHR increases, the Institute budgets for strategic research have also increased — from an initial amount of \$819,000 in 2001–2002 to \$5.3 million for 2003–2004. During 2003–2004, ICR committed a total of \$18.8 million over a period of 6 years to support the research initiatives proposed by the 6 Working Groups.

PRIORITY AREAS

Palliative and end-of-life care

Although traditionally associated with cancer care, palliative and end-of-life care intersects with many other clinical disciplines, including cardiology, respiratory medicine, critical care, nephrology, pediatrics, neurology and psychosocial oncology. As the aging population grows and best-care medicine increasingly has the capacity to prolong lives, society struggles with ethical and legal issues around the appropriate use of healthcare resources and with quality-of-care issues for patients nearing death. The Palliative and End-of-Life Care Initiative addresses research needs, gaps and opportunities — not only in basic science and the treatment of common symptoms but also in psychosocial, financial, spiritual, ethical and gender issues that result in patient and/or family distress or inadequate access to services.

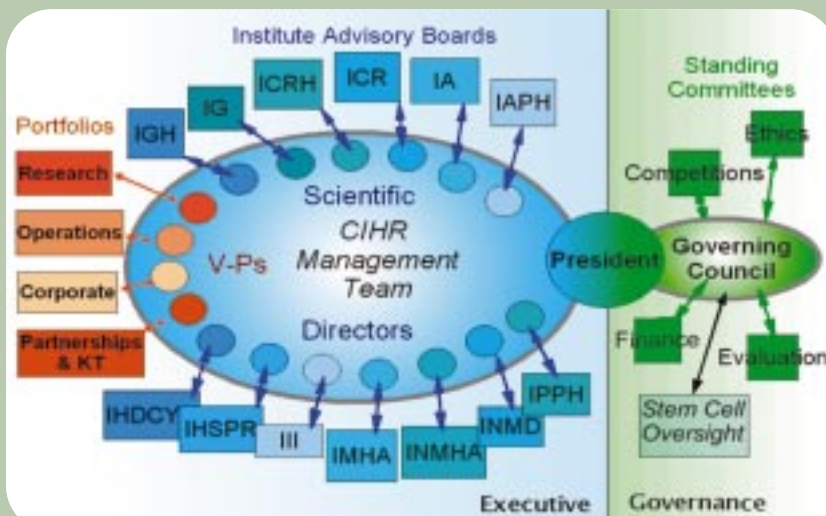
Through a multidisciplinary approach that extends beyond cancer and includes collaborations with multiple partners (Table 2), the initiative, launched in June 2003, represents a potential total financial commitment of more than \$12 million — making it the largest research initiative in this field ever undertaken in Canada. Programs include:

- the New Emerging Teams Program, which builds small, multidisciplinary research teams
 - 1-year pilot projects to facilitate new and innovative research
 - the Career Transition Program, which helps researchers gain expertise in palliative care research or change their focus area or discipline within the field
- In addition to this initiative, ICR is also funding a Training Program Grant in Palliative and End-of-Life Care, in partnership with NCIC, to train new investigators in the field.

Molecular profiling of tumours

The genomics era offers a new and exciting period in cancer research. Better understanding of the molecular and biochemical processes involved in all types of cancer promises development of novel therapeutics directed at specific tumour targets. In the next 10 years, we can

FIGURE 1. CIHR structure



INSTITUTES:

IGH: Gender and Health

IG: Genetics

ICHR: Circulatory and Respiratory Health

ICR: Cancer Research

IA: Aging

IAPH: Aboriginal Peoples' Health

IHDCY: Human Development, Child and Youth Health

IHSPR: Health Services and Policy Research

III: Infection and Immunity

IMHA: Musculoskeletal Health and Arthritis

INMHA: Neurosciences, Mental Health and Addiction

INMD: Nutrition, Metabolism and Diabetes

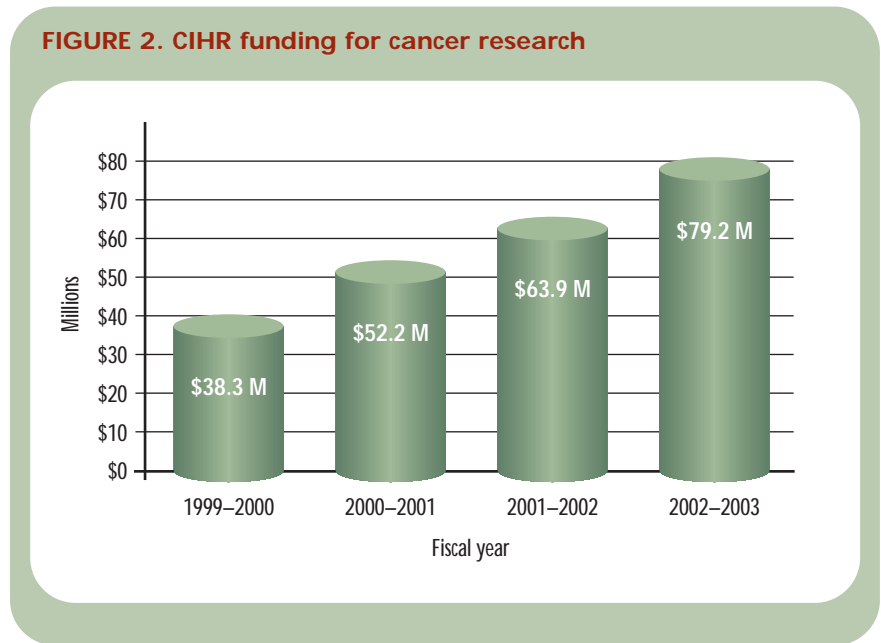
IPPH: Population and Public Health

anticipate discovery of a steady stream of new therapeutic agents, each designed to act on specific targets in the cancer cell. As well, innovations in genetic technologies will improve diagnostic, screening and therapeutic techniques. Specific genes involved in generating malignancies are constantly being identified, opening the door for risk analysis, potential genetic manipulations and gene therapy.

To capitalize on recent advances in molecular profiling techniques, researchers require access to tumour and tissue samples that are linked to clinical data: pathology reports, prognosis, response to therapy and clinical outcome. To date, Canada's tumour-banking system is fragmented, having areas of strength in certain provinces and little organized activity in others. Working with the Fonds de la recherche en santé du Québec (FRSQ), CAPCA, the Ontario Cancer Research Network, the BC Cancer Agency, the Alberta Cancer Board and other parties, ICR has allocated resources to connect existing data banks and develop standard operating procedures. ICR will provide \$675,000 per year for 5 years to support a CIHR Special Programs Grant for the formation of a national tumour bank network, beginning in spring 2004.

Clinical trials

ICR responded to the recommendations of the Clinical Trials Working Group by contributing \$3.5 million to the Canadian Clinical Trials Group, based at Queen's University in Kingston and largely funded by NCIC. ICR funding will increase the number of cancer clinical trials, including those addressing psychosocial and support issues. In collaboration with several industry partners, CIHR is actively investigating mechanisms to enhance development of new drugs and speed their passage from discovery in the laboratory to application in the clinic. Canada needs a new infrastructure for drug development and a



less cumbersome way to test new therapeutics, to capitalize on our ability to conduct long-term monitoring in our healthcare system. With the recent surge in availability of potential anti-cancer therapeutics it is important to provide the support necessary to maintain a strong clinical trials network in Canada.

Early detection of cancer

Early diagnosis of premalignant changes or early cancer offers the greatest opportunity for curative treatment. Screening tests likely to be useful on a population level should be:

- free of serious complications
- non-invasive
- cost-effective
- highly specific

An important criterion for a successful screening program is the degree to which the general population adopts it, especially in traditionally underserved communities

such as ethnic, aboriginal, rural and immigrant groups. ICR has committed an initial \$500,000 to this priority, with a view to investing in additional programs in future years. The initial contribution will fund 1-year operating grants designed to:

- create cross-pillar, multidisciplinary research teams to evaluate and compare new screening technologies
- perform mathematical modeling studies on the cost and benefits of existing Canadian cancer screening programs
- determine the rate of serious complications resulting from routine colonoscopies performed to detect colon cancer — a first step in the evaluation of colonoscopy as a population-based primary screening and preventive technique

Risk behaviour and prevention

As it is estimated that as much as 50% of cancer could be prevented by lifestyle changes, especially smoking cessation, ICR's main target for research in cancer prevention is tobacco use. Also highly implicated are environmental carcinogens, obesity, poor diet and lack of physical activity. ICR will concentrate on tobacco control and reserve some funds for potential partnership opportunities with other CIHR Institutes and organizations for studies focusing on other areas. Based on recommendations from the Risk Behaviour and Prevention Working Group, ICR has allotted \$480,000 per year for 5 years to CIHR's Tobacco Abuse and Nicotine Addiction initiative, coordinated by the Canadian

TABLE 1: ICR research priorities and funding commitments

Rank*	Priority	IAB lead(s)	Funding (millions) [†]
1	Palliative and End-of-Life Care	Neil MacDonald	\$4.7
2	Molecular Profiling of Tumours	Jim Woodgett, Gerry Johnston	\$3.4
3	Clinical Trials	Joe Pater	\$3.5
4	Early Detection of Cancer	Heather Bryant, Jacques Brisson	\$2.5
5	Risk Behaviour and Prevention	Roy Cameron	\$2.4
6	Molecular and Functional Imaging	Ian Smith	\$2.3

* Rank in order of votes received

[†] Allocated over 6 years, committed as of 2003-2004

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Tobacco Control Research Initiative (CTCRI). CTCRI represents multiple partners, including several CIHR Institutes, Canadian Cancer Society (CCS), NCIC and Health Canada. Exemplifying unprecedented collaboration among cancer-related organizations to fund coordinated research, this initiative emphasizes team-building and knowledge translation.

Molecular and functional imaging

Specific genetic alterations underlie many disease processes, including cancer. Molecular and functional imaging links these changes to image-related data. Detection, especially of very early changes, requires sophisticated technology, procedures and software, creating the need for expertise in bioinformatics, engineering, physics, chemistry and mathematics. Improvements are needed in imaging and spectroscopy devices, contrast agents, radiopharmaceuticals and optically-labeled probes. ICR will support small multidisciplinary teams that will facilitate the integration of expertise from the natural sciences into biomedical research. An initiative designed to promote novel technology applications in tumour imaging and to bring together researchers from the physical and life sciences was launched in June 2003. ICR has committed \$450,000 per year for 2 years for this project, beginning in the summer of 2004.

FUNDING MECHANISMS

Funding of CIHR Institutes' strategic initiatives begins with the posting of a Request for Applications (RFA) on the CIHR website.⁴ Currently, RFAs are

TABLE 2: ICR partners on the Palliative and End-of-Life Care initiative

- Canadian Breast Cancer Research Alliance
- CIHR Institutes:
 - Aging
 - Cancer Research
 - Circulatory and Respiratory Health
 - Human Development, Child and Youth Health
 - Gender and Health
 - Genetics
 - Health Services and Policy Research
 - Neurosciences, Mental Health and Addiction
- Health Canada
- Heart and Stroke Foundation of Canada
- National Ovarian Cancer Association

TABLE 3: Partners for funding cancer-related training grants

ICR partners involved in the funding of cancer related training program grants

- Alberta Cancer Board
- Cancer Care Ontario
- Cancer Care Nova Scotia
- Cancer Research Society
- CURE Foundation
- Fonds de la recherche en santé du Québec
- Michael Smith Foundation for Health Research (BC)
- National Cancer Institute of Canada
- Newton Foundation (Montreal)

posted twice a year in June and December. Depending on the program, some RFAs require an initial letter of intent to review the relevance and responsiveness of the proposed application. Full applications are peer-reviewed by specially created expert panels following the same process used in the operating grants program. Because many of the Institutes' initiatives are in areas with little capacity or history of success, these customized peer-review panels can more effectively judge the applications. To avoid any real or perceived conflict of interest, the peer-review process is handled by staff in the Knowledge Creation Programs Branch at the CIHR offices in Ottawa.

BUILDING CAPACITY


Ten years from now, Canada is expected to experience a shortfall of roughly 100,000 researchers and scientists. This projected deficit underlines an urgent need to build research capacity, an overarching theme that comes into play when setting priorities for cancer research. Following the creation of the Institutes, the CIHR Strategic Training Initiative in Health Research was launched in the spring of 2001 to support the Canadian health research community. CIHR is strongly committed to building capacity by training new innovative, world-class scientists. The Training Grants Program aims to encourage the next generation of researchers to engage in transdisciplinary, integrative studies in all 4 pillars of health research. CIHR and its partners have funded 84 training centres with capacity for a minimum of 2000 trainees — a total financial commitment of \$125 million over the next 7 years. ICR has allocated \$12 million over 7 years from the

Institute's strategic budget towards the support of 23 Training Programs that are specifically cancer-related. ICR's partners have committed a further \$7 million to this initiative (Table 3).

Despite many challenges in creating an entirely new cancer Institute and aligning its goals and strategies with existing cancer research funding organizations, ICR has succeeded in finding a niche through its role in the Research Alliance and Research Action Group of the CSCC. With the support of an excellent staff and a dedicated and committed IAB, ICR now plays a leadership role nationally and has been successful in forming partnerships through initiatives in areas such as Palliative and End-of-Life Care, Tobacco Abuse and Nicotine Addiction, and the Training Grant Programs. Although Institute strategic funds have not increased as fast as was at first hoped, ICR has provided important funding opportunities to the research community in areas that were underserved in the past.

FUTURE CHALLENGES

The creation of CIHR and the Institute of Cancer Research has had a significant impact on the way funding is managed in Canada. A national research agenda is now being implemented by CSCC in partnership with ICR and many other agencies and organizations. Building on its early successes, ICR is nurturing an innovative environment that is responsive to the needs of the research community and that will ultimately yield improvements in the prevention, diagnosis and treatment of cancer. The ICR will develop and expand on the current 6 priorities, while remaining responsive to input and suggestions from the cancer research community regarding new and emerging priority issues.

As its strategic research budget grows, ICR will explore new challenges where an innovative and coordinated approach involving national and international partnerships between multiple stakeholder groups will benefit research. ICR looks forward to a new age in oncology research, one where the findings from genomics and proteomics studies can be rapidly and efficiently translated into practical applications that will benefit cancer patients and their families. 

References

1. See www.cihr-irsc.gc.ca
2. Canadian Cancer Statistics 2003
3. Canadian Strategy for Cancer Control. Research Working Group Final Report, January 2002. Available at: <http://209.217.127.72/csccl/pdf/finalresearchJan2002.pdf>
4. See www.cihr-irsc.gc.ca/e/services/4377.shtml