



YEAR 5 IRP REPORT

CIHR

Year 5
International
Review Panel Report
2000-2005

June 2006



Canadian Institutes
of Health Research

Instituts de recherche
en santé du Canada

Canada

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Also available on the Web in PDF and HTML formats
© Her Majesty the Queen in Right of Canada (2006)
Cat. No. MR21-78/2005E-PDF
ISBN 0-662-43688-1

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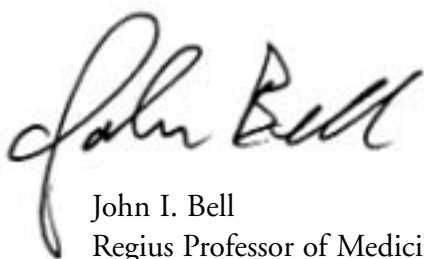
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Acknowledgements

The peer review process remains an essential part of maintaining excellence in all fields of scientific endeavour. It is rarely applied to the funding structures that underpin health research but can play a pivotal role in ensuring that the structures and mechanisms used for allocating resources are both appropriate and effectively applied. The Canadian Institutes of Health Research (CIHR) deserves much credit for undertaking an international review and putting itself under external, independent scrutiny at this important stage in its evolution. It may provide a model for other funding agencies to evaluate their internal structures and performance.

The review has benefited greatly from the very substantial effort made by the members of the review panel who have contributed greatly to its success. Their contributions before, during and after the February 2006 site visit have brought to bear an enormous wealth of experience from the global health research community. I would very much like to thank them for their patience and good humour throughout this very laborious process. In addition, this review could not have taken place without the full commitment of CIHR, in particular the support of the Governing Council, the President and his senior management team, the Scientific Directors and the staff of CIHR. The International Review Panel (IRP) had available to it very significant amounts of supporting information for the review, and our deliberations in Ottawa were greatly facilitated by face-to-face contact with many of CIHR's key stakeholders. I hope that the efforts of all these people have helped to deliver a report which correctly identifies the very considerable strengths that have developed around the CIHR concept over the past five years and also appropriately identifies aspects of CIHR structure and function that now should change to ensure that it successfully completes the next phase of its evolution. There remain many opportunities for Canada to provide international leadership in the area of health research.



John I. Bell
Regius Professor of Medicine, Oxford University
Chair, International Review Panel



Executive Summary

Canada has embarked on a bold journey to change its approach to the funding of health research and ultimately to influence its breadth, its quality and its impact on the health of Canadians and the delivery of health care. The creation of the Canadian Institutes of Health Research (CIHR) six years ago was an experiment to establish whether a single agency for health research funding and leadership in Canada could sustain the excellence in Canadian basic and clinical biomedical research but also expand more effectively into areas such as population-based research, health policy research, health services research and research using social sciences and humanities to address important health issues. A successful outcome would be indicated by an expanded capacity and increased output in research reaching into previously undeveloped areas, improved interactions between disciplines undertaking health research, effective knowledge transfer and, most importantly, a retention of excellence in all areas of health research.

The International Review Panel (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 has clearly been enhanced and new strategic initiatives have strengthened multidisciplinary research and training. Together, these changes have all occurred in a remarkably short timeframe, evidence of the commitment and success of the management team. The IRP feels now that CIHR should take stock and ensure that it has the necessary governance and management structures in place to further progress its mandate and vision.

A key component of the CIHR vision was a set of virtual Institutes, funded modestly but with responsibility for providing leadership and focus to a range of subjects at a national level. The selection of these Institutes and their leadership has been an important part of the first five years of CIHR development and was a major focus of our review. Also important, however, are the panels responsible for allocating much of the response mode research funding. We have therefore also attempted to consider the current state of the panel system in CIHR.

Our impressions of the CIHR at this moment of its evolution are intended to provide insights into its structure and function that will allow the successful development of this novel vision. The challenges in achieving objective evaluation of the outputs of



the CIHR so early in its expansion and transition has led us to make comments on some of the key components of a successful organization, particularly sound governance and management. The success of the CIHR in rapidly implementing many aspects of the new mandate over the last five years has led to a much larger and more diverse organization. The speed at which this transformation has occurred is remarkable and clearly has required extraordinary effort and energy. The CIHR is in our view now at an important inflexion point in its development. New structures need now to be imbedded, transparency in decision making and process is crucial and sound governance becomes increasingly important. We believe that this represents a natural progression in the growth of this new entity but nevertheless a crucial one for the long-term viability of the organization.

We have intentionally avoided interventions around the detailed operational management of the CIHR. We do not believe it is our role to judge the balance of funding priorities, the distribution or the appropriate size of the CIHR budget. The comments we make provide some reassurance that the CIHR model is one well worth pursuing but that crucial aspects of its structure and governance need now to be reconsidered in light of its recent growth and expansion. If addressed, these suggestions will ensure that internal structures in CIHR are accountable and that CIHR remains responsive to the key stakeholders, including the policy-makers and scientific community.

Our review has resulted in the following observations:

- The CIHR is clearly in a state of rapid evolution and has already transformed the face of health research in Canada. Evidence of the benefits of a more strategic approach to health research is apparent and multidisciplinary activity is widespread. Canada is beginning to enter into health research activities that have been previously inadequately resourced and underdeveloped.
- The CIHR has clearly made progress in delivering leadership in the Canadian research community fostering collaborations, creating an environment for capacity building, forging an integrated health agenda, creating multidisciplinary Health Research Institutes, developing Knowledge Transfer and a sound ethical environment for research.
- It is too early to make conclusive judgments as to the effectiveness of this model of health research funding based on currently available objective outputs.
- All 13 Institutes appear to be functioning well, providing leadership in their fields and providing a focus for strategic activities. The Scientific Directors are



all clearly contributing significantly to the success of the Institutes which are now fulfilling a crucial function in the health research community in Canada.

- Rapid growth, particularly of new strategic initiatives and panels, has led to excessive complexity. This complexity needs now to be reduced to enable opportunities and activities to be both focused and manageable.
- The panel system that is responsible for handling most of the research funding is currently under strain. It requires more academic leadership, and a review of process and structure for this system is necessary.
- A major outstanding challenge for the CIHR and health research in Canada is the apparent lack of coordination 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.
- Governance will be crucial in the next phase of CIHR evolution. Accountability and transparency need to be reinforced at all levels of the organization. Governing Council should consider its position as a main board of the organization and the executive team needs expanding and strengthening. A single research committee should be established to account for all research expenditure in the CIHR, and to agree on the balance of strategic and response mode funding in each research area.
- To formally provide scientific leadership across their disciplines, Scientific Directors should now be given oversight of their Institutes and their associated panels. Each should be responsible for ensuring the balance of strategic and response mode funding is appropriate and that the panel system functions more efficiently. It is likely that Scientific Directors (SDs) would participate in a central research committee.
- Rapid growth and the challenges associated with matrix management across the Institutes and Ottawa have created management challenges within the CIHR. The most appropriate structure for handling these issues should be considered after an organizational review.
- Knowledge Transfer (KT) has been accepted as an important part of the CIHR mandate. Progress has already been made in some areas of knowledge translation particularly in infectious disease, public health and some areas of health services



research. There remains lack of clarity about the definition of KT across the organization. More attention should be directed at providing leadership in the area of technology commercialization.

- CIHR should increase its emphasis on research in ethics as well as its governance responsibilities to ensure that the research it funds meets the highest ethical standards. Leadership in this area across Canada could come from the CIHR.
- It is important to determine and to collect the objective data for each research activity that needs to be collected to allow an effective review of CIHR activities in the future. In particular, terminal reports from all grant holders would be an essential part of this process. This will be crucial if the next review committee is to provide a judgment on the success of the CIHR model.
- Communication remains an important and challenging activity for the CIHR. The range of potential audiences, including funding partners, provincial and federal governments, universities, health researchers, international agencies and the citizens of Canada, make this particularly challenging. 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.



1 Introduction

In 2000, the Canadian Parliament enacted legislation that created a new structure for the support of health research in Canada. The Canadian Institutes of Health Research (CIHR) was established with a mandate to support health research in its broadest definition, incorporating the strong biomedical and clinical research activities historically funded by Canada's Medical Research Council (MRC) and also supporting research relevant to population and public health, health services research, and social science or humanities research relevant to health. This new structure incorporated research areas previously funded by the MRC, the National Health Research and Development Program (NHRDP) and the Social Sciences and Humanities Research Council (SSHRC). A research funding agency with this broad inclusive vision of health research is, to our knowledge, unique worldwide and represents a novel experiment in research funding for health. The new CIHR was to emphasize the importance of scientific excellence and also provide support to facilitate and accelerate the translation of knowledge as it might apply to patients and health systems, and to extend the knowledge-based economy in Canada. Significantly, emphasis was placed on the importance of Ethics, both in the governance of the best research and also as a research activity in its own right.

With such a bold and broad vision, requiring the creation of a whole set of new structures and programs, the CIHR must still today be seen as an organization in evolution. The past five years have been spent establishing the Institutes, developing a range of initiatives directed at improving capacity in areas where Canada had little previous research record and conveying the vision behind this project to the research community in Canada and abroad. These achievements will provide the platform necessary for the future development of the organization.

As the CIHR begins the next phase of its development, it will likely need to consolidate some of its activities, embedding new ones in an organization that can ensure that the vision behind CIHR is sustained. Our comments must be seen in this light and may be both important and timely if the organization is to continue to mature successfully.

The International Review Panel (IRP) was made up of 27 scientists and health care professionals. All but one of these individuals was based outside Canada and their expertise covered the full range of activities encompassed by the CIHR mandate,



including research activities in all four pillars, as well as expertise in knowledge transfer and ethics. Although the IRP spent a considerable time evaluating the 13 Institutes established within CIHR, it also took the opportunity to attempt to evaluate the current activity funded through the panels within CIHR and the organizational and management structures in place to ensure that its mandate was fulfilled. The IRP met for three days in February 2006 and was informed by significant documentation on the activity of the CIHR and its health research Institutes, feedback obtained from the health research community and direct contact with a range of stakeholders who contributed significant time and effort to come to Ottawa during the review to talk to the IRP. Full biographic details of IRP members are available in Appendix 2.

The IRP has had an opportunity to assess the progress made in establishing the CIHR over the past five years. This assessment cannot, however, accurately evaluate the scientific output of this new institution or effectively compare its success relative to its immediate predecessor, the MRC. Much of the last five years have been dedicated to establishing the structures and programs of the CIHR and the time taken between research funding, discovery or observation and the realization of those research studies in terms of publications, implementation in clinical practice, health service reform, policy recommendations or product development does not permit a realistic evaluation of this new funding model at this time.

The IRP has recognized, however, that while we are not yet able to thoroughly evaluate the success of this new model of research, as judged by the scientific output and impact of the Canadian health research community, we are nonetheless able to provide important insights into the effectiveness of the CIHR in managing its part of the health research agenda in Canada. We have achieved this by four different but complementary approaches through:

- review of materials and progress reports provided to us by CIHR and their respective Institutes;
- feedback from a diverse range of stakeholders involved in health research in Canada;
- face-to-face meetings with Institute Directors and researchers;
- assessment of the management structures and governance of the current CIHR to establish if these appear appropriate for creating and sustaining an environment likely to yield a productive health research base.

As we outline below, the product of our assessment will principally be our impression of the structure and function of the organization, followed by recommendations as to



how this structure might be modified to cope with its rapid evolution and to ensure its future success.

The IRP felt that despite its short life, CIHR has achieved a great deal, particularly in refocusing and energizing the health research community in Canada, as well as facilitating and promoting interactions between groups of researchers who had not previously worked together. It has also developed and facilitated a range of programs in population health and health services research that had not been supported by previous activities. Our impression was that much of the success in establishing the CIHR as it currently exists can be attributed to its current President, Dr. Alan Bernstein. The view widely held in the community and endorsed by us is that his vision and energy have been instrumental in the creation of the CIHR. Importantly, however, it is now essential to ensure that an appropriate structure, necessary to sustain this vision, is firmly in place.



2 Accomplishments

The CIHR mandate is *“to excel, according to internationally acceptable standards of scientific excellence in the creation of new knowledge and its translation into improved health for Canadians, more effective health services and products and a strengthened Canadian health care system”*. Although CIHR is still in a state of evolution and objective outputs are difficult to assess, at this point there is no doubt that the organization has made considerable progress in implementing its mandate. In particular, CIHR has provided leadership within the Canadian research community and has fostered collaboration with the provinces and with individuals and organizations in Canada and internationally that have an interest in health research. Collaborative programs abound within CIHR and there is clear evidence that the organization has been working effectively to bridge its activities to other health research funding organizations, with health care providers and provincial research agencies, with the Public Health Agency of Canada and with a wide range of international organizations. For example, the reach of its activities in areas such as Aboriginal health has extended to research councils in New Zealand and Australia. In total, partnerships have contributed substantially to the success of CIHR programs. These have grown steadily since 2000, almost doubling over the past five years.

Also in line with its mandate, CIHR has focused on creating a robust research environment, particularly in developing capacity in areas of health research in Canada and providing the necessary support to retain excellent research where it already existed. Programs such as the New Emerging Teams program provide a format through which research capacity can be developed in areas where it is required. A crucial accomplishment of the CIHR has been to support research across not just biomedical and clinical research, but also research relating to health systems, health services, health of populations, environmental influences on health, and social and cultural dimensions of health. Substantial activity in areas that have previously received little or no research support in Canada provides clear evidence that the CIHR has been delivering on its mandate across all four pillars of activity. A focus on developing multidisciplinary research was also a component of the CIHR mandate and this too has been effectively addressed by the CIHR. Examples of multidisciplinary programs incorporating multiple pillars and bridging Institutes within the CIHR include human embryonic stem cell research, consideration of issues relating to privacy and confidentiality, wait times research or the evaluation of



challenges associated with translating genetics into health care. These have provided information to support health policy decision-making and illustrate the importance of multidisciplinary research in the health arena.

In the area of ethics and knowledge transfer, progress is clearly being made in advancing these agendas at a national level. Particularly in the area of infectious disease, knowledge translation has been delivered in a rapid and effective timeframe; similarly in key issues relating to health service functions such as waiting times. Progress has also been made in the area of commercialization through the development of the proof-of-principle program and a technology commercialization program, another important aspect of the CIHR mandate.

The creation of health research Institutes was a major component of the mandate of CIHR when it was established and the selection of topics to be covered by health research Institutes and the establishment of 13 such Institutes must be seen as a major accomplishment of the organization. These research Institutes together cover all aspects of health and incorporate activities relevant to all of the four pillars of research. They have emerged as powerful components of the new vision of health research in Canada and, despite the limited resource available to them, have catalyzed a range of new initiatives in the health research arena in the country. To have achieved the successful delivery of 13 such organizations must be seen as one of the most significant accomplishments of the CIHR.

The accomplishments of the CIHR to date are many and virtually every aspect of the mandate has been developed significantly over the past five years. This expansion of activity has been greatly facilitated by the more than doubling of the budget of the CIHR compared to its predecessor, the MRC, providing the necessary resource to build and develop in new areas. Although the IRP was not in a position to judge whether or not this new approach to health research funding can actually deliver more outputs, it is clear that the CIHR has been active in pursuing all aspects of the mandate set within the CIHR Act and that many of these activities provide novel and potentially very interesting and productive approaches towards making health research both more effective and more relevant.



3 Opportunities

a) Canada could achieve excellence across many areas of health research

Enormous opportunities exist for Canada to achieve international excellence in all fields of health research. The country has a long and distinguished tradition in the fields of basic biomedical and clinical research and more recently has spearheaded innovative collaborative approaches in developmental and population health research. These fields are poised internationally for significant advances over the next twenty years. Few would question the view that biomedical research is one of the most exciting and potentially transforming areas of scientific endeavour thanks to a range of new technological innovations that allow cell and molecular biology, structural biology and genetics to provide crucial information into basic biological process and into the fundamental causes of disease. In addition, there are tremendous opportunities in population-based health research that will have a critical impact on the health of population and, similarly, many of the new insights into disease at a cellular or systems level can now be moved effectively into the clinical research arena. It is also clear that effort is needed to understand better the social factors associated with disease and its consequences and to better characterize, refine and optimize the delivery of health care based on research evidence.

Together, these pillars of health research create an imperative to rigorously pursue a broad and robust research agenda in Canada, with excellence at its core. The ability to manage and support all of these diverse activities through one agency provides many novel opportunities. In particular, it allows research to be more multidisciplinary and the results of research to be translated more effectively into practice. Properly managed, these advantages create more productive research interfaces that may ultimately lead to more innovation.

b) Internationally, CIHR is a new model for supporting health research

The novelty of the inclusive model of health research funding as prosecuted by the CIHR is clear. Through this process, Canada has become an international leader in bringing different components of health research together. Although significant cultural differences still remain between research areas, it is likely that this model will



provide important new research outputs relevant to human health. Its success has clearly been noted in other countries. For example, a similar model has recently been proposed in the United Kingdom and other funding agencies are considering expanding their remit along similar lines. This inclusive model may prove to be one of Canada's most important gifts to the international health research community.

c) Canada could benefit from the many outputs of successful health research

Canada and Canadians will be the major beneficiaries of the outputs likely to emerge from a thriving health research community. A better understanding of the biological processes that underlie disease and the application of this knowledge in a clinical setting will ultimately lead to better medicines and diagnostics for patients. Canadian scientists have historically made major contributions to basic and clinical science that have had profound effects on patient well-being. From the pioneering work on insulin by Banting and Best through the fundamental insights into stem cells by Till and McCulloch, these important scientific insights have continued to provide benefits to millions of patients in Canada and around the world. Ongoing investment through the CIHR is likely to produce many more such examples in the future.

At a population health level, there are remarkable opportunities to be gained utilizing the comprehensive system of health care found in Canada and some of its unique record linkage systems. Large-scale population studies are likely to reveal much about the major environmental factors and genetic factors that contribute to disease pathogenesis and will provide significant opportunities to adapt and target public health policies to reduce ill health and premature death in the population at large. Effective population health strategies to avoid disease processes before they are irreversible and costly have to become the mainstay of containing health care costs. These are likely to be effective as they result from collaborations across both basic and social sciences. As we become increasingly aware of the considerable impact that social factors have in disease pathogenesis, input from the social sciences and humanities in the health research arena are crucial to unpacking why social inequalities are so pervasive and powerful, and how best to reduce their impacts. As with all Western nations, the Canadian health care system is under continual pressure to become more efficient at delivering health services within a structure that has limited resources. Understanding through health services research how best to apply health care in the community and in the hospital setting is likely to prove increasingly important. A strong evidence base from health services research will be a major asset to the Canadian health care system and will ensure that the limited resources are spent most effectively for Canadians.



The funding and support of outstanding health research in all of its settings can provide Canada with a well-trained, dynamic workforce that will ultimately have an important effect on other aspects of the economy including the biotechnology and pharmaceutical sectors. The creation of new knowledge and the exploitation of this knowledge to create better medicines and diagnostics potentially could also generate a thriving, knowledge-based economy founded on health research. Although this is not a simple relationship, experience elsewhere has clearly demonstrated that investment in health research by government can have an important effect in attracting and creating commercial activity that can significantly drive economic growth as part of a knowledge-based economy. The creation of intellectual property from the biomedical science base is a crucial driver of this process.

All these opportunities could be realized if the CIHR were to successfully deliver on its mandate and if a focus is retained on internationally recognized excellence in its research endeavour. The IRP believes that Canada is particularly well positioned to exploit a coalition of health research communities as directed by the CIHR mandate. Few places in the world have the quality of health researchers, the universal health care system, the university structure and the mandate to put together a program such as that being developed by the CIHR.



4 Risks

a) Rapid expansion produces management and governance challenges

The CIHR concept is a novel one and its creation, followed by rapid growth, generates significant management and governance issues. For example, the establishment of “virtual” Institutes—and of so many at one time—is a new (and bold) idea. To have established thirteen of these in parallel over eighteen months is a considerable achievement. Similarly, there has been a dramatic expansion in research review panels, funding instruments and strategic initiatives over a very short timeframe. The growth in resources available to the CIHR over the first five years of its existence has allowed the organization to meet some of the expectations of the different constituencies brought together under its funding umbrella. Important new initiatives have been launched, knowledge translation programs have begun to make a difference to both the health care and public health system, and it is clear that many research groups are now working across disciplines and generating very considerable benefits. All these very recent developments need careful management, particularly now as the organization stabilizes after its rapid expansion. It is important now to ensure that the CIHR has in place both governance and management structures appropriate for its next five years.

b) Getting the balance right between strategic and investigator-led research

One opportunity created by the CIHR is the possibility of more strategic research than was historically supported through previous mechanisms. This strategic activity takes a number of forms, both generated through the Institutes and much initiated elsewhere both within and without the organization. Some areas of research are highly dependent on strategic initiatives, in particular areas of research activity where human capital is inadequate and the history of research endeavour in these areas in Canada is limited. In both population health and health services research, for example, strategic initiatives are crucial for developing the necessary capacity to broaden and expand Canadian health research. In other areas of research, however, there is also a continuing need to provide operating support for investigator-led research. Basic biomedical, clinical, epidemiological, and social scientists that have existing strong, investigator-led programs simply require basic grant support to carry out their



research programs. The tensions that currently exist between those requiring operating grant support and the need for strategic initiatives are likely to continue. The appropriate balance between these various forms of research funding, as with the balance between funding between disciplines, is a critical determinant of the future success of Canadian health research. This balance is likely to vary in different areas of health research so that no single formula can be applied across the organization. Both processes and structures must be established for the research community to productively and collaboratively participate in these crucial decisions. These deliberations must be transparent.

c) CIHR's broad mandate across many disciplines requires a diversity of approaches to achieving multidisciplinary research

One of the most important features of the CIHR has been its commitment to encourage research across different disciplines in the health research arena. This is likely to considerably increase opportunities for new and novel insights into disease and its major causes, particularly at subject interfaces where much innovation occurs. Multidisciplinarity, however, can be achieved in many different ways and, amongst the CIHR constituency, there should be different approaches to encourage this activity. The mandate of the Institutes was to promote multidisciplinary research, and many of the new strategic initiatives have encouraged applications that include investigators from different health research backgrounds. Initiatives such as the Large Team Grants clearly promote these interactions. This approach to encouraging multidisciplinarity is valuable in many settings but not all. Basic biomedical and clinical investigators often develop multidisciplinary programs, but they do so in a bottom-up fashion designed to solve particular problems that they encounter as they undertake their individual research programs. Collaborations and interactions are made to solve specific scientific problems that are encountered along the way and cannot be predicted in advance. This can be as valuable as predetermining multidisciplinary groupings in a strategic way. Both approaches to multidisciplinarity need to be valued and encouraged. In order to ensure this, the organization needs to be flexible, responsive and intelligent.

d) Has rapid growth led to too much complexity?

The rapid growth in the CIHR, including the establishment of 13 Institutes, eighteen new panels, a range of new strategic initiatives and the ongoing support of four pillars of research activity, has led to an organization that is vastly more complex than its predecessor. This is to be expected after a period of such intense development, but such rapid growth may lead to a lack of research focus and can distract from the primary objective of research excellence. An excess of review panels, different funding



opportunities, strategic initiatives and programs can be as bewildering to the scientific community as it can to the organization itself. Complexity is an expected consequence of rapid expansion and growth but it needs to be continuously managed and limited. In research funding, “simple” can often be the best approach.

But simplicity is a value not just because it makes the system easier to manage, since even simple organizations can be poorly managed. The risks arising from the rapid growth of the organization include:

- The growth in the number of panels may lead to inexperienced panel members, reviewer fatigue and possibly inferior reviews;
- The growth in the number of initiatives (on its face, a welcome sign of healthy funding), when coupled with a relatively new area of study, may lead to insufficient applications of quality. Moreover, the sheer complexity may cause investigators (especially first time applicants) to become disillusioned while experienced researchers may become frustrated spending more time working through the system than conducting research;
- Confusion can arise if the communication of the changes and their rationale have not been adequately communicated to the stakeholders.

The IRP appreciated that the growth in the number of initiatives was perhaps an inevitable consequence of the new broadened mandate of the CIHR and the need to build capacity in underdeveloped areas of research for Canada. Now, five years later, it is an appropriate time for CIHR to step back and both reduce and manage this complexity.

e) Sustainability and succession is likely to be challenging for the organization

A crucial component of the CIHR structure must be that its momentum and success can survive the change of leadership at all levels. The planned changes in Institute Directors will, in our view, be challenging if each Institute is to maintain the corporate memory that has made them successful to date. Transitioning the centers for these Institutes geographically as well as changing individual leaders may create significant difficulties. In addition, changes in the Executive Team now or in the future will require a management structure that is not individual-specific, a management structure that is stable with clear roles and responsibilities. These elements will be essential if the success achieved by the CIHR to date is to be sustained.



f) Financial risks are significant

Important financial risks are associated with the current funding structure for CIHR. As with many government funded agencies, there is little opportunity for CIHR to carry resources over from one funding year to the next. This provides very little headroom should the budget for the CIHR stop growing or even shrink, given the long-term commitments that are necessary to ensure successful health research activities. Managing a year-on-year funding model is extremely difficult for the Executive Team and is fundamentally at odds with the nature of research, little or none of which operates within a one-year timeframe. Such a funding structure is unlikely to produce the best resource allocation decisions.

g) Other national and provincial funding initiatives have significantly increased the demand for operating support from CIHR

The IRP was surprised by the extent, diversity and complexity of the research funding environment in Canada for health research. Canada appears to have more potential sources of such research funding than many nations. In addition to charities and foundations, Provincial governments appear to be playing an ever-increasing role in this funding landscape with significant funding initiatives in Alberta (Alberta Heritage Foundation for Medical Research), British Columbia (Michael Smith Foundation), and Quebec (Fonds de recherche en santé du Québec). In addition, the Federal Government in Canada has rightly recognized the importance of supporting several different components of health research. Although operating support is primarily provided through CIHR, significant amounts of Federal resource has allowed Canada to compete internationally in major projects in the areas of genomics (Genome Canada) and in research areas considered ripe for commercialization (Networks of Centers of Excellence). Importantly, very significant investments in infrastructure (Canadian Foundation for Innovation-CFI) and personnel support (Canada Research Chairs Program-CRC) have also been made by the Federal Government in recent years. Each of these activities represents an important investment in the field of health research. Crucially, however, each of these strands of research funding has important consequences for other funding streams. For example, significant support for new buildings and infrastructure through the Canadian Foundation for Innovation (CFI) would not be as productive were there also not essential investment in personnel through numerous Provincial programs and through the Canada Research Chairs Program. These investments show a strong and impressive commitment by the Canadian Government to strengthening all aspects of the health research portfolio.



The single health research funding agency most affected by investment made through many of these various funding streams is the CIHR. This is because the CIHR remains the single, major source of federal funds for the operating grants necessary to ensure that the investments made in personnel and infrastructure succeed. Each investment in personnel or building infrastructure inevitably puts further demands on the CIHR operating grant budget. If all such streams of funding were coordinated this would provide a powerful expansion in capacity across the research sector in Canada. When not well matched, however, significant new demands on grant support cannot be met. Failure to align these funding streams at a federal level creates a serious risk that supply and demand in health research becomes dangerously unbalanced.

Although complete alignment with various Provincial funding streams may prove to be difficult to achieve, rationalization of Federal sources of support for health research is essential and should be possible. The IRP believes that some mechanism needs to be identified to better orchestrate and coordinate the various sources of Federal research funding in the health arena to ensure that the most effective use is made of the significant investments currently being made in personnel and infrastructure. Without the necessary balance between operating grants and posts or infrastructure, much of the benefit associated with these other investments may be lost and some mechanism to ensure better coordination of these various funding streams is, in our view, crucially important. Various indicators suggest that there is not currently a balance between these investments. For example, the fall in success rates in CIHR's competitions, despite the increase in the number of successful applicants, suggests a mismatch between growth in capacity and operational support.



5 The Institutes and Allied Research Themes

The creation of a set of virtual Institutes was one of the major changes in health research funding introduced by the CIHR and hence a review of the Institutes was a major focus of the IRP. We also, however attempted to look at the state of science funded through the panels associated with the scientific themes of the Institutes as this is where the majority of research funding of the CIHR is allocated. Although considerable efforts had been made in the year preceding our review to accumulate feedback on the success and utility of the Institutes, we felt that the information available to us was insufficient to make clear scientific judgments about the achievements of the Institutes. Information about publications was not confined to work performed on CIHR grants and it was unclear which of the work that might have related to CIHR funding may have passed through the review panels with no input from the Institutes. Finally it is clear that most of the programs that could be ascribed to CIHR rather than its predecessor had not yet had sufficient time to deliver outputs that could be readily measured.

Despite these challenges, we felt comfortable that we could provide input on the direction that Institutes had set for themselves and could also comment on their apparent impact on the research community and their structure and leadership. We could also provide information on the general state of research activities funded by the panels in areas related to each Institute. In doing so we believe our assessment provides crucial interim information that could guide CIHR in its continued development.

Our review of the Institutes and their allied panel-based research activities was undertaken primarily through a set of interviews with leading scientists associated with the Institutes (including all Scientific Directors of Institutes) and with health researchers associated with panel activity. Extensive discussion at these interviews allowed us to explore the apparent success or failure of these activities. A summary of these deliberations for each of the Institutes and its related area of panel-based research activity is found in Appendix 1. These reviews indicate that the Institute structures within CIHR have brought an important new dimension to health research in Canada.



a) The Institutes have, without exception, made significant progress in fulfilling their mandates

The Institutes have all achieved considerable progress in developing and implementing an agenda to coordinate and develop their research area. The IRP was particularly impressed by the quality of the Scientific Directors of all the Institutes whose energy and enthusiasm have clearly been central to the success of these new organizations. Despite resource constraints, these Institutes have operated extremely effectively. Each has developed a specific set of strategic initiatives as well as provided leadership through training initiatives, mentoring and workshops.

The Institutes were particularly successful in expanding their research activities beyond the traditional research pillars and it was clear that the Scientific Directors operated extremely effectively as a group to encourage and develop multidisciplinary and cross-Institute initiatives. Because of the success of these virtual Institutes, what had emerged in the CIHR was a very substantial “strategy generator”. We learned of one Institute that alone has developed sixteen new strategic initiatives. Although it is very encouraging to see the development of these strategic plans, it may prove difficult if not impossible for the CIHR to either manage or deliver on such a large number of initiatives and some approach to managing both the number and expectations that might arise around these initiatives should be considered. These and other strategic initiatives provide a challenge within the current funding envelope to ensure that the balance between strategic and response mode science funding remains appropriate for each subject area.

The IRP noted that initiatives unlikely to be funded in the previous funding system were now beginning to be discussed and realized. For example, prospective cohorts that provide a crucial dimension to population health research had been initiated or were being discussed by several Institutes and several public health research initiatives had been successfully delivered. The creation of Institutes had also led to a detailed evaluation of research strengths and weaknesses in each research area. Strategic initiatives often were targeted at building capacity in areas not previously well served with research scientists (e.g. the Centres for Aboriginal Health Research Capacity Building). There were many examples of novel and interesting new schemes for training and networking within scientific areas that are clearly having impact. For example, a new PI meeting within one Institute provides a model example of mentoring and networking within and between scientific areas.

The IRP identified strong and effective leadership in all the Institutes and attributed much of the success of the Institutes to these individuals. It is clear that the Advisory



Board system is also operating well. The Institute Directors were clearly committed to the CIHR mandate and were particularly effective in developing interdisciplinary research both within and between Institutes. We were also told that many scientists have strongly identified themselves with particular Institutes. This is true in both the traditional disease-based Institutes with a historical biomedical focus (i.e., biomedical research focus, such as Genetics or Infection and Immunity), as well as Institutes where pillars three and four have emerged as dominant themes (Gender and Health or Health Services and Policy Research). Each Institute clearly had specific and unique approaches to developing their field and this diversity of approaches, associated with the flexibility of the Institutes, is clearly one of the very considerable strengths of the CIHR. In many cases, considerable leverage had been gained by collaborating with other funding agencies.

The IRP believes that all Institutes are now operating effectively and that it is too early to consider changes in the number or scale of the Institutes. Without robust and objective data about outputs that can clearly be ascribed to Institutes, it is inappropriate for the IRP to recommend such changes. We believe that future flexibility is important and that a change in Institute number and structure should evolve, but would be much better judged after the Institutes had a longer period to develop their programs and when objective data are available on which to base these decisions.

In summary, as vehicles to develop the mandate of the CIHR, the Institutes are undoubtedly having a very significant impact and the Scientific Directors deserve considerable credit for making the Institute concept viable and potentially extremely successful.

b) The affiliated research programs managed by the panels require leadership and more active management

The IRP also had an opportunity to consider the status of research funded entirely through the panels. Although the research funded through the panels was judged by those we met to be of a high standard, there was concern expressed that the number of panels and levels of funding available to the panels were creating significant problems for investigator-led research activities. Because of the number of mechanisms available for strategic initiatives, it was difficult to be clear about the relative distribution of strategic *versus* investigator-led research funding. As a result, the IRP was not positioned to make a judgment about what this ratio was or ought to be in each research area. It is clear that although Institutes and centrally driven strategic initiatives have the benefit of advocacy and leadership to ensure their agenda



will happen, the panels do not benefit from such support. An explosion of new initiatives, new panels and new funding streams has also put a very considerable pressure on the peer review system and we were told that researchers are now suffering from significant review fatigue. Ensuring that panels are supplied with high quality and senior scientists is apparently proving difficult and the changing of panels due to potential conflicts of interest makes these problems even more difficult. The small size and short duration of some grants, the establishment of a large number of new grants committees and the presence of committees that see few proposals suggests that the peer review system is perhaps not being optimally managed. There appears to be no open and transparent process for the establishment of new panels, nor does there appear to be clear criteria or process for their evaluation and, in the event that a particular panel is no longer needed, how this decision is to be reached. There have been many new panels established and none eliminated in the past six years.

These challenges associated with the peer review panel system illustrate some of the current risks associated with rapid growth and increased complexity. It would be timely for this important activity within the CIHR to be reviewed and possibly restructured. Crucially, the governance of scientific decision-making and resource allocation across all subject areas needs to be reviewed alongside consideration of the optimal structure to support the process. Ideally, a single accountable committee should have responsibility for this activity and should properly represent the views of the scientific constituency and stakeholders. This committee could consider and agree on the balance in strategic *versus* response mode funding in each scientific area.

Simplification of the number and responsibilities of the panels could be orchestrated by this committee, leading to a considerable reduction in the complexity of the organization. Importantly, this committee should be responsible for the distribution of the entire research budget of the CIHR (including panels, strategic initiatives and Institutes) and the implementation at a research level of the agreed strategy approved by Governing Council.

c) Knowledge Transfer and Ethics provide important and novel components of the CIHR vision

The IRP noted the important attention paid to both Knowledge Transfer and Ethics in the mandate of the CIHR and hence considered the development of these aspects of the CIHR function in all our discussions with Institute leaders and the scientists associated with the panels. The inclusion of KT in the CIHR mandate is an important distinguishing feature of the organization as it recognizes the imperative to make the research undertaken by the CIHR relevant to the health or health care



systems of Canadians. We were told of several impressive examples of KT applied to major public health issues. These were particularly evident, for example, in the Institute of Infection and Immunity where a rapid scientific response to the SARS outbreak was formulated and where work on prion mediated disease, avian influenza and water safety may have an impact on public health. The recent work on waiting list times across Canada, led by the Institute of Health Services and Policy Research, is another example of KT relevant to the health care system. Despite these notable examples, however, most Institutes are just beginning to contribute to the KT agenda, largely because there remains uncertainty as to what constitutes KT in different scientific areas. A clear and uniform understanding of the meaning of KT was evidently lacking in large parts of the CIHR. Most successful KT also requires partners wishing to utilize information obtained for this purpose and the fragmented nature of health care provision by the provinces could be a significant obstacle to this process. Nevertheless, we felt that some significant progress was being made in this area and that the CIHR was on track to make a significant difference to the public health and health care system if this commitment to KT was extended across all Institutes.

Interestingly, while much of the discussion on KT focused on knowledge translation, considerably less focused on commercialization as an important part of the CIHR mission. In other countries, commercialization is a major focus for those responsible for funding health research as it potentially underpins a knowledge base for the economy and creates a workforce capable of supporting such economic growth. Again partners are crucial for this activity to occur successfully. Universities are particularly important for this aspect of KT as this is where most research activity takes place. The IRP noted the very mixed success of Canadian Universities in technology commercialization with some Institutions having a world-class reputation in this area while other major Universities have a much less impressive track record. Given the importance of this aspect of KT to government in other countries the IRP felt that this activity should be embraced more openly and effectively even if the role played by CIHR is one of facilitation to ensure that the benefits of the research funded include commercialization where relevant.

Ethics is also a crucial component of the CIHR mandate, and it is evident that CIHR believes that ethics and science are jointly necessary for successful research. The CIHR commitment to Ethics is reflected in a number of ways including the existence of a central Ethics Office whose Director reports to the President, the presence of ethics delegates on Institute Advisory Boards, and the many relationships that CIHR has with other bodies that have ethics mandates/responsibilities. Despite difficulty in finding a permanent Ethics Director, CIHR's ethics portfolio has a number of



accomplishments to its credit including: the facilitation of several public policy initiatives that had federal impact (e.g., stem cell research, privacy, Aboriginal health research); funding for 22 ethics research projects; an effective transition from MRC to CIHR Standing Committee on Ethics, and the development of standards for Research Integrity.

Opportunities exist not only to provide support for CIHR-funded research from an ethical perspective but also there exist remarkable opportunities to develop research programs exploring bioethics in a range of research settings. The IRP identified four key opportunities:

- To position Canada as an international leader in all aspects of ethics in health research, including best practices, innovative mechanisms for oversight, governance, review and related policy topics.
- To become an international laboratory for developing effective methods for integrating ethics, science and policy.
- To support innovative ways of integrating ethics into all aspects of CIHR activities (i.e., within/across Institutes; from CIHR central to Institutes; and from CIHR to external partners and collaborators).
- To develop ethics capacity in young Canadian researchers in a way that includes broadening the scope of field beyond ethics and law to include other areas/disciplines.

As with other aspects of CIHR, the Ethics portfolio also faces certain challenges. The IRP identified the following four: (1) *Leadership*. The IRP recognized that the lack of consistent ethics leadership over time had prevented the Ethics portfolio from blossoming, and further prevented it from using its considerable convening power; (2) *Focus*. The IRP noted that the Ethics portfolio is somewhat blurred between facilitation and leadership. The former is a service function and is necessary for good governance of research in CIHR; the latter is both a scholarly and management function and is vital if CIHR is to take advantage of the many opportunities described above; (3) *Capacity*. The IRP noted that until the recent hiring of a permanent Ethics Director, there was relatively little ethics/policy expertise within CIHR central offices. But this addresses only one aspect of the issue. It is equally important for CIHR to appreciate that there remains a small ethics research community in Canada. It is a well-respected and in many instances internationally recognized group of scholars and experts. But for CIHR to thrive it will need to continue to build capacity to train the next generation of researchers and scholars; (4) *The Research Ethics Board (REB) system and related governance issues*. While Health Canada rather than CIHR is responsible for the governance system in Canada for the



protection of human subjects, the IRP noted with interest that CIHR is in a unique position to promote its continued development and (if necessary) reform.

We appreciate that CIHR is but one of many parties engaged in both KT and Ethics. It was evident, however, that the potential leadership role of Canada's main funding agency in both these areas could be very powerful. In many issues in KT and Ethics, we repeatedly recognized that, if CIHR had not provided the lead in Canada, many of these activities might not have occurred at all. We would also add that if CIHR does not provide leadership in the future, who will?

d) Scientific Directors now play a crucial role in the success of CIHR

Our review of the Institutes and their associated panels indicated that much of the academic leadership for health research was now coming from the Scientific Directors of Institutes. Despite the limited amount of resource being spent by the Institutes, their leadership provides a focal point for research activity generally in the areas covered by the Institutes and these individuals have become important and vocal spokespersons within the CIHR structure. In this regard, their views of the future of the CIHR are important.

The IRP met the Scientific Directors who expressed the view that the CIHR and the Institutes needed to help reduce the complexity of the organization. In their view, large initiatives have not always proved better than fewer small, focused initiatives. We would support this sentiment. The Scientific Directors believed that they were optimally positioned to take responsibility and defend the panels, both for strategic initiatives and for the open competition. This view aligned strongly with the views of the IRP. The Institute Directors also felt they could be more involved in the evaluation and structuring of the peer review system. The recognition that reviewer fatigue is widespread and that insufficient senior investigators are involved in the panels was suggested by the Scientific Directors. They emphasized the complexity of different funding streams in the Canadian system and indicated that this was a particular challenge in making the CIHR resources operate effectively. Again, this resonated with the view of the IRP.

As one Scientific Director said to us, "The Institutes are now the CIHR". Although not initially empowered to dominate the CIHR agenda, we believe that through the considerable efforts of the Scientific Directors and their Advisory Boards, the Institute agenda has truly become a central feature of the CIHR. Our view is that the



Governing Council should recognize this and use this structure as a mechanism of managing the entire CIHR portfolio at a scientific level, to some extent decentralizing control of the panels to Institutes and Institute Directors and using as a group the Institute Directors as scientific adjudicators of funding balance and decisions in the organization. This would ensure accountability and responsibility within the science community for crucial funding decisions and would also ensure that the Governing Council would be considering for approval decisions about funding taken by full-time, active scientists fully in touch with all the relevant communities (see Section 6 b).

The crucial leadership role played by the Scientific Directors led the IRP to consider the succession challenges associated with moving Institutes every five to seven years. Although the Institute Directors were less concerned about the impact of these transitions, we believed that this is a significant issue for the CIHR. Institutional memory based around existing Institute Directors will be lost every five to seven years as new Directors establish themselves in other parts of the country. It is likely that administrative staff associated with the Institute Directors will not move and hence there is a significant risk that the continuity necessary for the sustained success of these Institutes will be thwarted. One solution to this problem will be to ensure that each Institute has some key activity based in Ottawa. This would be necessary if Institutes took on some responsibility for their associated panels (see below) and hence an administrative Associate Director for the Institute, based in Ottawa and reporting to each Scientific Director, could provide the essential administrative support to ensure that panels were properly managed and also contribute to the continuity as Scientific Directors changed. Another suggestion would be that a Deputy Director for the Institute be identified three years before the retirement of a Scientific Director and that this Deputy Director would succeed the existing Scientific Director on his or her retirement. Although longer term tenure for Scientific Directors has been suggested, we do not believe a ten-year tenure would be helpful for the organization. Our belief is that a five- to seven-year arrangement is appropriate. We believe that the Governing Council should consider options for ensuring the smooth transition of these Institutes at the time that Scientific Directors change.



6 Governance and Management

a) Executive and non-executive functions

The remarkable growth in programs supported by the CIHR has been greatly facilitated by a highly flexible approach to funding, a dynamic and energetic President and a decision-making structure that has allowed new strategic initiatives to emerge from the Institutes and the management team to be implemented relatively quickly and efficiently. As the organization evolves, however, we believe that its governance and management must also evolve to ensure clear lines of responsibility and accountability. The size and complexity of the organization demands that it now applies well-established rules of corporate governance and management. We believe that a re-evaluation of these issues needs to take place at all levels of the organization to accommodate the significant change in size and complexity seen over recent years.

It was unclear to the IRP whether the Governing Council (GC) was operating as an Advisory Committee, a Committee with executive functions or as a main Board of the CIHR. We believe its role should be the latter and clarity on this point is urgently needed. The Governing Council should undertake a review of its own position with regard to the sound corporate governance of the CIHR based on standards widely applied in the private sector. As the main Board of the CIHR, it may wish to have the ability to appoint the CEO and needs to consider the corporate governance issues associated with having a unified Chairman and Chief Executive role. As the Governing Board, the GC should not be involved in subcommittees with executive functions or in directly managing key parts of the CIHR activity such as decisions about funding approvals or funding distributions. It should agree on a strategy for the organization with the President and then allow executive functions and key committees to implement that strategy. This very important aspect of governance now needs attention.

The role of the executive team also now needs review. The President needs to take the responsibility of chairing the committee responsible for funding structures and decisions, and should provide the link between the GC and the management team. The executive team in Ottawa is now changing with the retirement of the VP,



Research, and consideration should be given to how this crucial management structure should be shaped for the future, particularly in the light of the significant changes in breadth of activity and staffing seen in the organization in recent years.

b) Research funding structures and the role of Scientific Directors

We expect that an early priority as the organization evolves from this point will be to reconsider the structures in place for evaluating and reviewing scientific research proposals. There has been a dramatic growth in the complexity of these structures over the lifetime of CIHR. We understand that there are fifty-five standing panels and over fifty other additional panels used to evaluate research activities. Two thousand five hundred reviewers are now required to support this system, compared to eight hundred when CIHR was created. Although the majority of grant funding flows through these panels, they have not been seen as the responsibility of any senior scientific figure associated with the CIHR, but have been managed administratively by the Vice-President for Research. Twenty-six new committees have been created and none have been eliminated. The IRP was concerned about the lack of transparent process in determining which committees exist, what criteria were used to determine the need for new committees and which body was responsible for making these important decisions. This expansion of committees amounts to strategic expansion that brings additional resource to particular disciplines. As such, transparent processes are essential to ensure these strategic changes are equitably agreed and that new committees cannot be used to create strategy.

Our panel was also interested by the comparative success of the virtual Institute concept that underpins the CIHR. We felt that the Institute definitions were creative and unique, not being structured entirely in and around disease or therapeutic areas. The IRP was surprised to see how much of the activity in each Institute research area was funded through the open panels over which Institute Directors and Institutes had no direct or indirect responsibility. This, we believe, is now a fundamental issue that needs to be addressed. Indeed, when questioned, the Institute Directors unanimously and enthusiastically felt it was their responsibility to support the open competitions and the panels. It is our belief that this relationship should now be formalized. This would have many benefits. For example, those scientists applying entirely through the open competition with no involvement in strategic initiatives would nevertheless feel that the relevant Institute and Institute Director were responsible for ensuring an appropriate distribution of funds. This accountability is crucial in the process as at the present time it is not clear who is responsible for looking after the interests of those applying only to the open competition.



No-one is in a better position than the Scientific Directors (SDs) and their Advisory Boards for deciding the appropriate allocation of resources between operating and strategic initiatives. This ratio needs to vary significantly in different Institutes – old, more established disciplines may choose to resource their constituency through more operating grants while disciplines where capacity building and development is important may rely more heavily on strategic initiatives. Indeed, the IRP noted that this is *de facto* often the situation. For example, about 10% of CIHR's overall investments in neuroscience is strategic, reflecting that maturity and strength of that community while over 50% of the investment in Aboriginal health is strategic. Similarly, the Institutes should be in a strong position to oversee the committees that fall within their research domain. The difficulty in identifying panel members will be partly resolved by engagement of the Scientific Directors and their Advisory Boards in the selection and recruitment of panel members. Importantly, the Scientific Directors could, with the President, establish specific criteria for the introduction of new panels, make more efficient use of the existing panels and establish criteria and a process for eliminating panels that were no longer necessary. These lines of accountability and process are crucial and separating the Scientific Directors and their Advisory Boards from the major flow of resources from the CIHR is unhelpful and, in our view, unnecessary.

It seems inescapable that, given this important role played by SDs in creating a strategic vision for CIHR and their emerging role as advocates for both Institutes and related panels, SDs should now be given further responsibility to oversee the panel activity in their scientific area. It would also seem reasonable that a future role for SDs might be to form the core of the central committee replacing the Research Priorities and Planning Committee (RPPC) responsible for the allocation of the whole research budget. Such a committee would resolve the important outstanding issue of accountability and responsibility for funding decisions and its alignment with the strategy endorsed by the GC.

c) Organizational structure and management

As with all rapidly expanding organizations, the CIHR is facing challenges in managing its administrative workforce. The administrative staff in the CIHR has grown to three hundred and forty in a very short timeframe. Our Panel was unable to do a full review of this structure, but our discussions with employees, management and stakeholders suggested that there is an evolving need to ensure that with such a large administrative workforce, the roles and responsibilities for each individual in the organization are clearly defined and that accountability is clearly understood. Each



individual should be aware of those responsible for key decisions and should be clear what their own responsibilities are in that process. This internal management is made particularly challenging by the matrix of relationships between the management team responsible for core functions in Ottawa and the Scientific Directors and their teams responsible for the Institutes.

We believe that achieving clarity of management structures should now be an important goal. This, we believe, is likely to be best resolved by initiating an organizational review. This should help establish an appropriate level of senior management support for the CIHR and should help clarify the roles and responsibilities of the administrative staff of the organization. This review should re-examine the role of additional Vice-Presidents and should consider a potential role for a chief operating officer. Attention should be paid to ensuring that lines of accountability are clear and, in particular, that the staff in the department responsible for managing the panels has clear leadership. Given the considerable expansion in activity and scope of the CIHR, it is not surprising that a review of this kind is necessary. The organization has to date relied very heavily on a small number of very capable senior managers who have carried the very significant burden of expansion. Going forward, its mission will demand more such senior support and clarity of responsibilities throughout the organization.



7 Communications

As the CIHR evolves, communication becomes an increasingly important function, both for achieving adequate communication within the organization and with its funded health researchers and also with the range of stakeholders associated with the CIHR including, importantly, policy officials and the public. This task has many dimensions and will continue to demand significant resources and energy. The IRP has not, as a committee, assessed in detail this function but our impression is that the CIHR communicates major health research findings to the public effectively through its central communications function in Ottawa. Communications with stakeholders, particularly Provincial and Federal Governments, universities and funding partners, is clearly a crucial function, again best served by the central communication function. This we were told has not received the attention it deserves and concern was expressed over the difficulties some important stakeholders have had in communicating effectively with CIHR. Communication with the public relating to public education and improving the public understanding of science, however, is a function best devolved to scientists, ideally through the Institutes. Similarly, the Institutes require significant capacity to communicate effectively between them and with the scientists who ally themselves with individual scientific areas. Therefore, we believe that, as the organization grows, communication is likely to become increasingly important. In this phase of consolidation, more effort needs to be made in communicating with stakeholders. As with other aspects of governance, some devolution to scientific Institutes would be merited.



8 Evaluation

The experiment that CIHR has undertaken to develop a new approach to health research is a crucially important one. It will be difficult, however, to evaluate whether or not it has truly been successful if processes are not in place to facilitate evaluation now and in the future. We are aware that a team exists with responsibilities for evaluation of various CIHR functions and, indeed, the IRP benefited from the work of this team during our visit to Ottawa. Nevertheless, it is clear that the necessary objective data to properly evaluate CIHR's impact and success is not being collected. The extensive review of the Institutes done last year was based largely on feedback and interviews and simple data such as publications emerging from CIHR-funded grants are not yet available. The IRP was surprised that end-of-grant reports are only a requirement for applicants seeking a subsequent grant. We believe that end-of-grant reports provide an important mechanism in accumulating data on achievements that could be used for future evaluations. Distinguishing between the contributions of the CIHR and those from other sources requires thorough documentation of grant outputs. We are conscious of the fact that the mandate of CIHR calls for activities that are particularly difficult to evaluate. Knowledge Transfer, Ethics and the activities particularly in pillars three and four do not lend themselves easily to conventional evaluative methodology used for pillars one and two. Nevertheless, there are standard metrics in all these settings (e.g. evidence of the research being used in policy development) and more effort needs to be invested in ensuring that these are collected and analyzed to plot the relative success of the organization. We believe that this process needs to be addressed immediately so that adequate information is available to assess CIHR objectively on its performance at the time of the next review and, importantly, to quantitatively measure some aspects of its activities against the MRC's productivity.



9 Summary

We hope that this review will provide important signposts to the CIHR as it continues to develop its program in health research in Canada. Establishing new and novel structures such as the CIHR is never easy and is a challenging task that inevitably will be met with resistance from within the research community. Thus, it is unlikely that it could be achieved without problems. Given that the new structure is only six years old, the accomplishments of the CIHR leadership and, indeed, the health research community in Canada generally, in delivering the mandate are clearly substantial. Like most new organizations in both the public and private sectors, creating new structures and new programs requires rapid and effective decision-making and the willingness to take risks and make mistakes. Without this approach, it is likely that this new structure for health research funding in Canada would never have emerged. There also comes a time, particularly after periods of rapid growth and development, to consolidate and bed down the activities which have clearly been successful, to reduce complexity and to ensure that the organization has the governance and management structures to move through its next phase of evolution. We believe that the CIHR has now reached that point where attention must be paid to issues of process and transparency that will allow CIHR to continue to thrive and be sustained into its next phase of development. As an experiment in new ways to approach health care research, there are many signs to suggest that the CIHR will ultimately be an important new model for health research funding, particularly if time is taken now to reconsider how many of the important innovations that have been introduced in the past six years can be established for the future. Simplification and reorganization now is likely to assure the success of this important experiment and guarantee the excellence and breadth of Canadian health research for the future.



Appendix 1

Reports on Individual Institutes and Their Related Open Competition Research

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Institute of Aboriginal Peoples' Health (IAPH)

Breadth of Research in This Area

Mandate of Institute: Supports research to address the special health needs of Canada's Aboriginal people.

Status of the Institute of Aboriginal Peoples' Health (IAPH)

This is an area of health research where capacity is currently limited but where significant opportunities for interactions with other Institutes exist. The Institute has a strong and well-informed Scientific Director. It has focused on building capacity, both amongst researchers and within Aboriginal communities to participate in research. ACADRE centres have been particularly effective in developing this participation. The improved competitiveness has led to a significant increase in open competition resource that has come to this field. This Institute has been successful in developing interdisciplinary research as well as national and international partnerships, in particular partnerships with the New Zealand and Australian Research Councils on Aboriginal health programs. There are significant opportunities for interactions with other Institutes, particularly those interested in the major chronic diseases which are often prevalent in Aboriginal populations. There is an opportunity for a "Grand Challenge in Aboriginal Health" which might provide additional interest in this particular area.

This Institute has made very considerable progress in broadening the discipline base engaged in this area and in integrating research across research pillars. Its research program is highly strategic as capacity building remains an important component. Knowledge translation in this setting moves in both directions between researchers and Aboriginal communities and back again. Similarly, Ethics has been handled well in this setting, but needs to be extended with a focus on setting standards for conducting research in Aboriginal communities.

The open and targeted competition systems in this area of health research have largely been strategic in nature. This balance should probably be maintained for the immediate future, but it would appear that the CIHR is investing appropriately in this strategic area. The training program looks successful and should not be altered.



Recommendations

General recommendations should be to maintain the present policy settings and strategy. The ACADRE program should be extended to eight centres and ethics guidelines should be finalised and widely disseminated. Partnerships remain a key opportunity for this Institute and its associated open competitions. Importantly, the presence of this Institute has been crucial in establishing and maintaining the trust of Aboriginal communities necessary to undertake research in this setting. No fundamental changes are recommended in the status of this Institute or its mandate.



Institute of Aging (IA)

Breadth of Research in This Area

Mandate of Institute: The advancement of knowledge in the field of aging to improve the quality of life and the health of older Canadians. The Institute supports research to promote healthy and successful aging and to address the causes, prevention, screening, diagnosis, treatment, support systems, and palliation for a wide range of conditions associated with aging.

Status of This Area of Health Research in Canada

Aging research faces many challenges: it is a small research community with a diverse research portfolio. The CIHR is seen to have facilitated the growth of aging research in Canada. IA and CIHR have made progress in building capacity in this area by creating two new committees: Biological and Clinical Aspects of Aging (BCA) and Social Dimensions of Aging (SDA). More applications are received in BCA as compared to SDA. Many biomedical and clinical researchers have introduced topics in aging into their work to take advantage of these funding opportunities (though they do not necessarily identify themselves as scientists specializing in aging). However, there is a strongly perceived need to continue to build capacity and critical mass in aging research, especially in pillars three and four.

The launch of the Canadian Longitudinal Study on Aging (CLSA) has been a major initiative of the IA that has the potential to be a highly influential study in this field. This initiative is recognized internationally as a major innovation in multidisciplinary aging research.

Introduction of Pilot Project grants has been successful in the attraction of new researchers into this field. IA also participates in doctoral research awards and fellowships. Funding below the open competition funding cut-off for young researchers is also done. CIHR must develop continuing programs for scientists in this field, particularly mid-career researchers. Researchers get pilot grants in aging, but often there is no mechanism for continued support.

Some funding for aging research comes from outside sources. Many agencies in the aging field support research in pillars two to four but there are none for biomedical research on aging. The discontinuation of the CIHR group grants had a negative effect on continuity of research in this area. The CIHR budget is not increasing sufficiently to maintain current capacity.



Transformative Features of This Health Research Area

The CLSA has been an important vehicle for scientific development across most CIHR Institutes and has served as an integrative and multidisciplinary focus across a broad front. It has also been important in the development of ethics issues related to long-term longitudinal population studies. IA has also been a leader in pursuing KT strategies by obtaining input from older people as to issues of relevance to them and educating the population on aging issues. The Institute recognizes the importance of multidisciplinary collaborations in the field of aging.

Status of Open and Targeted Competition Systems in This Area of Health Research

There is some discontent within the field about the failure to raise funding in line with demand. The current system of two reviewer committees works well and researchers in this area feel that their proposals are assessed fairly. However, there is a disconnection between the Institute and the peer review committees so there is a lack of feedback in the process and, consequently, the Institute is not able to take action in response to the committee's collective experiences. Open communication would improve matters.

Status of Training Systems in This Area of Health Research

There has been successful investment in capacity building in this area and the Institute has taken a leading role in this with CIHR support. There is a perceived lack of capacity, however, in the field of clinical science. The CLSA offers a great opportunity for research training. There is a major need for mid-career support to ensure that the new cohorts of young scientists develop into tomorrow's leaders.

Status of the Institute of Aging (IA)

The Institute appears to be soundly based and fit for the future. The fact that it successfully managed the transition from one SD to the current one is a sure sign of the strength of the Institute (and this provides some learning for CIHR as a whole). It has clear strategic priorities and has striven to develop a KT focus even though it has not received consistent support with this endeavour. The Institute has contributed substantially to the mandate of CIHR and would clearly like to do more in terms of KT. Its budget is a major constraint. The Institute is well regarded by its scientific community. It has only recently embarked on international partnerships and their role



and purpose need to be clarified. The Institute is also encouraged to benchmark its portfolio internationally and prioritise the need for Canadian research in the aging field.

A number of issues and potential problems were identified in relation to the IA:

- integration of the biomedical side with other researchers in aging is a challenge;
- small community of researchers;
- problems with mid-career support;
- researchers doing aging-related research not identifying with IA;
- capacity raised but budget not;
- CIHR needs to clarify role of KT;
- CIHR should support IA with advice on ethics;
- invest in training clinical scientists in aging;
- Scientific Director transition lessons to learn for other Institutes;
- CIHR support for interdisciplinary research needs to be maintained or expanded;
- IA leadership role in this field.



Institute of Cancer Research (ICR)

Breadth of Research in This Area

Mandate of Institute: To support research to reduce the burden of cancer on individuals and families through prevention strategies, screening, diagnosis, effective treatment, psychosocial support systems, and palliation.

Funding distribution currently 90/5/2.5/2.5 across the four pillars, but good efforts are being made to address pillars two to four, e.g. with palliative care, tumor banks, wait list initiative, proposed cohort studies.

Status of This Area of Health Research in Canada

The overall impression of cancer research across Canada is good, based on the personal knowledge of panel members and the 2004 publication 'snapshot' provided to us. Basic cell and molecular biology are strong; epidemiology and population health studies seem relatively weak on an international comparison. Clinical trials activity was not well documented but seems moderately strong; we were told this is supported largely through the National Cancer Institute of Canada (NCIC). ICR has plans to catalyze population/epidemiology research, e.g. with a large cohort study, but we were not able to assess these plans. Substantial funds will be needed for a study of adequate scale.

Transformative Features of This Health Research Area

Efforts to broaden the discipline base are good: see above. They have had limited impact so far because of limited resources. Similar comments apply to integration across pillars.

Strategic research priorities: The ICR has led successful initiative in palliative care and in infrastructure e.g. tumor bank and training fellowships. There are substantial opportunities if the ICR/CIHR strategic plans can be interfaced with those of the NCIC and of the Canada Foundation for Innovation (CFI) in particular.

KT integration and action by the ICR is currently quite low but the Institute has helped in the creation of the Canadian Cancer Research Alliance (CCRA). In general, the ICR does not see KT as a priority because it is being taken forward by others; but they see opportunities through increase of communication with the Minister of Industry, and if increased resources can be obtained to bring drugs and diagnostics to market.



The ICR also so far had little activity in the area of ethics, although it has started discussion on an ethics board for Clinical trials and Ethics issues in the human papilloma virus (HPV) studies. It may be that ethics is better taken forward centrally in CIHR with individual Institutes making specialist input.

Status of Open and Targeted Competition Systems in This Area of Health Research

The review team saw almost no functional relationship between the ICR and the open competition for cancer funds. This seems a major structural weakness in the CIHR organization. It is recommended that linkages be put in place. The panel suggested that the ICR might have a more direct influence on the open review process.

Status of Training Systems in This Area of Health Research

The training systems for younger researchers seemed to be very good. The panel did not however specifically discuss clinical research training pathways. As in most countries, continued career support after the initial stage was less clearly defined. Attention to this may be important for retaining the best young researchers in Canada. The four young researchers the panel was able to speak to were particularly positive about the role of CIHR in supporting new investigators meetings set up between the Institute of Genetics and other Institutes.

The panel was also concerned about disconnect between large capital investments (e.g. from CFI), and the difficulty in matching these with provision of training grants and operation grants. There would appear to be an opportunity to improve the training pipeline if better alignment of these can be achieved.

Status of the Institute of Cancer Research (ICR)

The Institute has several key accomplishments: It has carried out an extensive consultative process to determine its priorities; it has funded 22 training grants; it has carried out strategic initiatives under pillars two, three and four described above. By far the strongest area of cancer research in Canada is cell and molecular biology. Recognizing these strengths and the need to build capacity in other areas, ICR has focused on pillars two to four. Perhaps as a result of this, ICR seems somewhat disconnected from the majority of the cancer research community. However, the Panel concluded that it has made an effective contribution and should be encouraged to pursue its current plans.



Institute of Circulatory and Respiratory Health (ICRH)

Breadth of Research in This Area

Mandate of Institute: To support research into causes, mechanisms, prevention, screening, diagnosis, treatment, support systems, and palliation for a wide range of conditions associated with the heart, lung, brain (stroke), blood and blood vessels, critical and intensive care, and sleep.

Status of This Area of Health Research in Canada

Basic research in this area is thriving; there is an established talent base with many new investigators. The Institute has integrated these groups effectively. Outcomes research is world class in heart failure and ICU medicine.

Transformative Features of This Health Research Area

ICRH has mobilized the community and created partnerships from bench research to clinical research to outcomes research. Examples include: the Resuscitation Outcome Consortium (ROC), Heart Failure group and the BREATHE program with the Cystic Fibrosis Foundation.

Status of Open and Targeted Competition Systems in This Area of Health Research

As a result of intense public relations work by the Scientific Director, many grants have been received leading to grant overload. More resources are necessary in terms of money to fund grants and review infrastructure. We recommend the introduction of Modular Grants Budgets with small, \$50,000, medium, \$150,000 and large, \$450,000. ICRH has used its targeted funds wisely, driven by the priorities of training, gene/environment, regenerative medicine, maternal/fetal interactions and others.

Concern was expressed about the lack of continuity between health care funders and health research. The view was also expressed that not all sports are team sports and support for single investigators remains crucial. The community has noticed severe application pressure and lack of resources to support operating grants in this scientific area. In the training area, the STIHR program has been a major priority although concern was expressed about the need for uniform application.



Recommendations for the future suggest that attention be paid to the Scientific Director replacement, given the importance of the current SD to the success of the program. Modular budgets have been suggested for the open competition and it has also been suggested that more attention be paid to easing in new investigators. Evaluation of the impact of the teams established in terms of health economics or quality of life measurements as well as publications would be helpful. Many opportunities exist in the areas of sleep, stroke and environmental impacts. These can be delivered if the budget permits.

Status of Training Systems in This Area of Health Research

Major priority was the STIHR program with 10 funded programs now extant. Recommendation to have a uniform application with a menu of options among programs.

Status of the Institute of Circulatory and Respiratory Health (ICRH)

One strength of this Institute is its Scientific Director who has vision and energy. It is sad that such an excellent Director must end his term. This Institute has an exemplary record.



Institute of Gender and Health (IGH)

Our panel was impressed with the IGH and gave it high marks in almost all areas. We were very impressed with the leadership, evidenced by the well-organized thoughtful presentation by the leader and by the perception of her team [as presented by the four individuals who visited with our panel] that she is the power driving IGH forward. Under her leadership, the IGH took advantage of the CIHR opportunities and filled nearly all of their goals. IGH developed 5 research priorities, leading to the creation of 16 strategic initiatives. There were 226 grants, 61 training awards, 22 strategic proposals and 67 interdisciplinary teams. IGH has invested > \$18 million in grants and awards.

IGH used many small grants, training programs, national workshops, and expanding diversity career support to attract and train many new women scientists. Building capacity and increase in grant funding have accelerated. IGH dedicated 60% of its budget to building research capacity. In open competition, 414 grants (of 1643 applications) were funded. National partnering (49) and international partnering (23) increased, the highest levels of partnering achieved by any Institute. This rapid expansion fostered the development of multi-focus multidisciplinary teams, which our panel thought was the most successful transdisciplinary program among the Institutes. IGH also appears to have done a good job in emphasizing knowledge transfer, by making knowledge transfer a requirement of all RFAs, and funding 44 grants emphasizing knowledge transfer. IGH also assumed leadership roles in medical ethics and law.

Therefore, our panel is enthusiastic about the IGH program, and thought this would not be a good time to recommend major changes, in view of the progress and momentum of IGH in its first years. Every young scholar and senior investigator with whom we spoke to about IGH said they would not be where they are today without the inspirational, educational and financial support from IGH. We recommend continuation of the multidisciplinary multi-focus teams, the training and support of women in science, the continuation and expansion of national and international partnerships, and the focus on health [vs. disease] outcomes.

The main limitations at this time are their inability to describe the content or quality of funded IGH grants in women's research, or their evaluation. We were told that evaluation activities are now in the planning stages. We were also told about the paucity of qualified grant reviewers with no conflict of interest – a problem common to other research systems and not unique to IGH.



We make several recommendations, many self-identified by the IGH faculty as areas for improvement. We agree that the timing is right for considering the value of smaller vs. larger or longer grants, defining methods to evaluate existing programs and the quality of the science, and deciding what criteria constitute success.

Our panel noted that the avenue for junior to mid-career faculty needs to be widened. The IGH faculty self-identified the need for increasing the amount of funding for new investigators, for early mid-career investigators, and for correcting the absence of grants for longer term research. Few if any current long-term grants exist, and most 2-year grants are not renewable. This limits the type of cohort studies which are necessary for health planning, and will also limit evaluation of knowledge transfer's impact on policy, practice and awareness. The IGH should consider whether larger or smaller grants have a greater impact per dollar.

We suggest IGH consider some larger longer grants, the development of a Women's Health Newsletter [for lay women], a focus on ethical issues related to women's reproductive health and freedom, and that they further expand diversity career support.



Institute of Genetics (IG)

Breadth of Research in This Area

Mandate of Institute: To support research on the human and model genomes and on all aspects of genetics, basic biochemistry and cell biology related to health and disease, including the translation of knowledge into health policy and practice, and the societal implications of genetic discoveries.

Funding: Fair distribution between the four pillars.

Status of This Area of Health Research in Canada

The Canadian genetic community is a strong community with a long tradition and history of successes and major achievements. The overall impression of the review team regarding the quality of genetic research and investigation in Canada is extremely positive. The Scientific Director has invested much time and energy by setting a strong bottom-up organization, responding to needs of the investigators and ensuring that goals and priorities are addressed. The strength of the community and the strong leadership capacities of the Scientific Director have resulted in the remarkable achievement of the IG.

Transformative Features of This Health Research Area

The IG has identified 6 research priorities to address what they regard as weaknesses (Population Genetics and Genetic Epidemiology of Complex Diseases, Health Services for Genetic Diseases) and build on strengths (Genomics, Proteomics, Integration of Physical and Applied Sciences into Health Research and Clinical Genomic Research). The annual New PI meeting organized by the Institute is a brilliant idea to achieve its goals and foster partnerships with other Institutes. The fact that this initiative has been reproduced by other Institutes is a proof of relevance of this initiative. Also, an IG support to PIs working in IG mandate is provided on a competitive basis and designed to fill program gaps (e.g. clinical investigator awards, one year bridging operating grants with a high success rate).

Status of Open and Targeted Competition Systems in This Area of Health Research

The review team appreciates that the strengths/weaknesses are being addressed by a targeted competition system of RFAs in a very effective manner. At least 2 RFAs are launched in various priorities particularly Health Services, Clinical Research,



Proteomics, Bioinformatics, Ethical Legal and Social Issues (GELS). The review team also appreciates that the issue of KT and public awareness is a major concern of the IG which is also covered by RFAs. Several initiatives in this field deserve particular mention and interest e.g. “be a gene researcher for a week”, “Gee! In Genome” traveling museum exhibit. Owing to the quality of IG, excellence of science and relevance of genetics in medicine and public health, the review team recommends to increase the budget of this Institute.

The peer review system seems to be fair and effective. The review team recommends that the Institute populates the panel with more senior reviewers as role models for the more junior panel members.

Status of Training Systems in This Area of Health Research

The training system of younger researchers is very good. Considering that the number of physician scientists is slowly declining, the clinical investigatorship award, MD/PhD awards, and genomic medicine/human development program are regarded as an opportunity to attract the best young clinical scientists, foster clinical research in genetics and retain and recruit bright investigators to Canada.

Status of the Institute of Genetics (IG)

The Institute of Genetics is highly productive and competitive at the international level. Its output in terms of gene discovery and understanding of disease mechanisms is outstanding.



Institute of Health Services and Policy Research (IHSPR)

Mission

The stated mission of the Institute is “to support innovative research, capacity-building and knowledge translation initiatives geared towards improving the way health care services are organized, regulated, managed, financed, paid for, used and delivered, in the overarching interest of improving the health and quality of life of all Canadians.” Its focus includes health workforce planning, management of the health care workplace, timely access to quality care for all, managing for quality and safety, understanding and responding to public expectations, sustainable funding and ethical resource allocation; governance and accountability; managing and adapting to change; linking care across place, time, and settings; and linking public health to health services.

The Institute grew out of the earlier National Health Research and Development Program, and has brought considerable vitality to CIHR. Many of its innovations – such as systematic research reviews, building interdisciplinary teams, outreach to users of research, building relationships with communities and funding partnerships, emphasis on knowledge translation, privacy sensitive research environments – have stimulated CIHR-wide action and enhanced CIHR’s standing with important constituencies. In turn IHSPR has benefited enormously from nurturing by CIHR central staff.

Accomplishments

The key accomplishments the review committee found were:

- Significant impact developing a new cadre of young investigators and capacity building in health services, health systems, and health policy research by supporting a nurturing research environment, and supporting research at all levels (trainees through established investigators). These efforts include building interdisciplinary teams, influencing evolution of team funding tools, building teams in emerging priority areas, Interdisciplinary Capacity Enhancement (ICE), and establishing summer Institutes.
- Fostered the creation of the Canadian Association of Health Services and Policy Research.
- Developed innovative process such as the Listening for Direction I and II workshops to ensure that the Institute research priorities are responsive to the needs of decision-makers.



- Rapid responses including research useful in responding to SARS crisis, establishing Wait Times Benchmarks (assembling evidence based on clinical implications of waiting times for different procedures and conditions such as hip replacement, cardiac surgery, and others), and meeting research needs of the Romanow Commission and the Kirby Senate Committee on Canadian Health System Reform.
- Provided direct support to national policy experts and other Institutes as Theme 3 experts.
- Creation of the Healthcare Policy Journal.
- Innovative partnerships with decision-makers and with the Canadian Health Services Research Foundation.
- Developed research systematic review process that has been vital to decision-makers and posted research syntheses on the website accessible to all.
- Supported the basic science development of health services research through a highly successful RFA for research advancing theories, methods, and measures of health services research.

Key Strengths

- Strong leadership by Scientific Director;
- Interdisciplinary focus;
- Capacity building in health services research;
- Responsiveness to decision-makers;
- Theme 3 support to CIHR and individual Institutes.

Key Weaknesses Imposed by External Constraints

- The Institute and its investigators are limited by the lack of health care information from several provinces and lack of comparable data on health services across provinces where they exist;
- Tension between supporting Theme 3 research within other Institutes and maintaining strategic initiatives of IHSPR;
- Started from a lower base of support; took time and effort to compete for funding tools originally designed for biomedical research (e.g. such as the Equipments and Maintenance grants and the Team grants);
- Canada Research Chairs are less likely to go to health services investigators because their departmental “homes” are generally less well integrated and weaker within university hierarchies;
- Inadequate attention to primary care research;
- Inability to link health services data across time and place;
- Inadequate attention to variations in health services, case-mix adjusted.



Balance Between Open and Targeted Competition Systems

- Initiated the move from 80/20 to 100/0 decision on distribution of open competition funding which has resulted in a more equitable distribution of open competition funding.

Specific and General Recommendations

- Stabilize health services research capacity by filling the gap in salary funding between new investigators and Canada Research Chairs;
- Catalyze the development of a national health system database (e.g. 5% sample) designed on models working in Manitoba and British Columbia that would capture health care utilization including primary care, specialty care, inpatient care, pharmaceutical use, and other services, expenditures, and clinical data across services and over time;
- Catalyze development of academic centers/units for health services research; consideration should be given to establishing strong academic units, centers or schools to help attract researchers and obtain Research Chairs;
- The IHSPR and IPPH are both individual Institutes and two of the four pillars that are supposed to be integrated into each of the 13 Institutes. Thus, these two Institutes have “double duty” to serve across Institutes and strengthen their individual strategic agendas. Additional resources at the CIHR level to guide the work of the integration of pillars within each of the Institutes would relieve some of this burden;
- Permit carry-over of unspent grant money;
- Build the base for primary care knowledge generation;
- Institute staff need to have permanent positions without risk of geographic displacement when Scientific Directors change, and Scientific Director terms need to be extended;
- Participate in discussions of impact of privacy policy on research capabilities, particularly use of existing databases;
- More emphasis on tracking and reporting on research products and impact.

Summary

The review team was very impressed with the agenda and strategic planning that the IHSPR has undertaken in a very short time. We support their efforts with the very highest levels of enthusiasm. We are impressed with its accomplishments to date and look forward to its future.



The review panel suggests the following four opportunities for the future of the Institute:

1. Creation of a national health services database; and work on making provincial health system data comparable;
2. Cross provincial analysis of variations in provision of care and health outcomes, controlling for case-mix, learning from innovations in provinces that can generally apply;
3. Support research on integration of care including primary care, community care, tertiary care, pharmacy, and social sector;
4. Forecast need for health professionals (primary care, specialty care, nurses, others).

The overall impression of this Institute by the review team is to retain status quo in administrative structures while providing added resources to enhance the ability of the Center to foster Theme 3 and contributing to Theme 3 foci in other Institutes.



Institute of Human Development, Child and Youth Health (IHDCYH)

Breadth of Research in This Area

Mandate of Institute: To support research to enhance maternal, child, and youth health and to address causes, prevention, screening, diagnosis, treatment, short- and long-term support needs, and palliation for a wide range of health concerns associated with reproduction, early development, childhood, and adolescence (note: this mandate is extremely broad and achieving success across this breadth demands collaboration with other Institutes).

Status of This Area of Research in Canada

The overall status in this area is good. Canada is an international leader in many important areas of this field such as developmental origins of health and disease, developmental neuroscience, child development, the social determinants of child health and life course epidemiology.

A great deal of multidisciplinary research is already being done in this field, largely due to the efforts of, initially, the Canadian Institute for Advanced Research (Fraser Mustard) and now provincial groups as well as IHDCYH. However, the challenge faced with this abundance of broad multidisciplinary research will be to maintain and increase the depth of the research being done and to ensure that the new knowledge created underpins provincial and federal policy-making not just in health, but in education and other portfolios. How this is done challenges traditional linkages (e.g. CIHR to health). The Institute has identified new strategic areas to further strengthen the research landscape in the area (see comments on gaps in research below), although the lack of population data in establishing priorities was noted.

Some provinces (BC, Manitoba, Quebec) are more advanced than others and these are also the provinces which have powerful large population databases which support this research area. There is a need for better population data across all Canada, not just in this area but across all health, demographic and risk factor groups and to enhance pillars two, three and four.

Transformative Features of This Health Research Area

The Institute has encouraged collaboration across disciplines and has provided funding for research in pillars three and four which previously had little opportunity



for CIHR funding. A new peer review Child Health committee has been effective in addressing gaps and allows researchers the security of having their applications properly reviewed. Both basic and social scientists appeared to be excited about the opportunities for their research from these new collaborations.

IHDCYH has launched innovative initiatives such as the New Investigator program in partnership with the SickKids Foundation and the Start-Up Grants for new PIs. The Institute has developed partnership with some outside Canadian and international partners as well as with other CIHR Institutes (e.g. the RFAs on obesity and asthma). Proposed RFAs with the CIHR's Institute of Aboriginal Peoples' Health and the Inuit and Aboriginal Health Agency continue this novel approach.

The RFA in asthma and air quality incorporates innovative ways to integrate knowledge translation with relevant end-user, policy and community groups (for example regulatory agencies) co-funding the RFA and hence having a stake in using the results. The RFA in partnership with the Canadian Paediatrics Society is an excellent example of KT research, investigating whether paediatricians use treatment guidelines and why or why not.

Status of Open and Targeted Competition Systems in This Area of Health Research

IHDCYH currently participates in the open competition through its new Investigator Program for child health research and its start-up grants for new PIs. These grants both fund applications above 3.5, but below the funding cut-off, providing additional opportunities for new investigators in this field. In addition, the Institute has created a new peer review panel, the Children's Health committee, to ensure the fair evaluation of the applications in this area as well as the allotment of CIHR funds to this research.

Status of Training Systems in This Area of Health Research

Training in this area of health research was deemed to be acceptable. The Institute was concerned about support for clinician scientists with a conflict between clinical time, paid by the province, and research time, paid by the federal government. This causes conflict as it does not allow CIHR to buy time for clinicians to do research as it would for teaching staff for example. More emphasis should be put on the training of mid-career researchers at CIHR. The possibility of training and support for multidisciplinary collaborations should be considered.



Status of the Institute of Human Development, Child and Youth Health (IHDCYH) including recommendations

The Institute is doing well in terms of the CIHR mandate across all four pillars with evidence of increasing collaboration across disciplines, which was obviously exciting for many younger scientists we interviewed. The Institute should be encouraged to maintain this momentum. The relative neglect of birth defects research and prevention, given the outstanding fetal alcohol research going on in Canada, was noted. Similarly, child, adolescent and parental mental health was also neglected; linkages with other Institutes programs (IAPH, IG, IPPH, INMHA) is recommended to ensure that such important priorities are researched. Some of the younger basic scientists mentioned that underfunded collaborative grants do not adequately support them as PIs (reminiscent of the undervaluing of biostatisticians in the past!). The transition to a new Director was obviously difficult and raises generic issues for CIHR concerning the handover to new teams and the need for support for the new staff and some corporate memory to be maintained.

Working with other Institutes and external agencies (Provincial health and other bureaucracies such as education, disability and family services) should be encouraged. Sharing and enhancing KT models and activities could be fruitful, as there appears to be considerable confusion across pillars as to what KT is. The ethics agenda appears limited to some aspects of cohort studies with little other successful activities, in spite of significant ethical issues around reproduction, early life decisions and genetic screening. This may relate to the small ethics research capacity in Canada. Ways to enhance this via CIHR and others should be encouraged. This Institute, along with Public Health should, with others outside CIHR, champion the collection, linkage and analysis and protect the privacy of, population data nationally, along the lines of the excellent models which already exist in Manitoba, BC and Quebec. Such data enable epidemiological analyses, objective priority setting, elucidation of causal pathways and the evaluation of clinical and population care, with scientific rigour and lack of bias.



Institute of Infection and Immunity (III)

Breadth of Research in This Area

Mandate of Institute: To support research to enhance immune-mediated health and to reduce the burden of infectious disease, immune-mediated disease, and allergy through prevention strategies, screening, diagnosis, treatment, support systems, and palliation.

Status of This Area of Health Research in Canada

The research in Infection and Immunity in Canada is very well developed. There is a large, mature group of seasoned investigators who appear to have embraced the CIHR model. There is very considerable strength in pillar one in particular and good bridging between this basic science and clinical epidemiology. The Scientific Director clearly leads by example and has the confidence of much of the community. This is an example where Knowledge Transfer has worked very well and has provided rapid responses to a range of public health requirements.

Important limitations in this area of research include the challenges associated with succession, particularly given the strength of the current Scientific Director. More clarity about the ownership of panels and resourcing of those panels is required and there is clearly a problem identified by this group about how resources for strategic and open competitions are agreed. There are also questions about the process of establishing new panels as this group had requested several new panels be developed and received no response in the context of more than 20 other new panels being established. Clarity on process here should be important.

Finally, there is not yet a significant issue in the area of autoimmunity that has wide and important health care impact.

Transformative Features in This Health Research Area

They have been, in particular, the major projects in response to infectious diseases that have important public health implications. Work on food and water purity, SARS, avian flu and prion-mediated disease are all excellent examples of how the research strengths of this Institute and its related community can have a profound impact on the health care system in Canada. It would appear that the health care system may now be dependent on this Institute's leadership to make crucial decisions



about its response to a range of infectious pathogens and, in this context, those decisions are likely to be much more soundly based on evidence.

There has been year-on-year growth in the number of investigators and grants funded in this area and the Institute has identified a series of strategic priorities that are both acute and more long-standing.

The Institute has made significant strides in integrating ethical issues in the important scientific challenges presented in areas such as SARS, water safety and HIV prevention and treatment. Its Institute Advisory Board (IAB) has included expertise from the bioethics community and should be a model that can be replicated. It is clear that here, as elsewhere, the Research Ethics Board (REB) system is potentially disabling to clinical research.

The central funding for training that is provided to the Institute has been of benefit. The consolidation of programs for training into larger thematic training schemes is viewed to be a significant new benefit as it allows one strong training scheme often to replace several small, less substantial and effective programs (e.g. HepC).

Recommendations

Convergence of leadership provided both for the Institute and for the open competition system. This could achieve the necessary accountability and would leave the constituency largely responsible for taking decisions about allocation of funds between programs. It is clear that processes are not in place to deliberate equitably and effectively between a range of strategic opportunities presented to CIHR, including those associated with major public health challenges. We believe that, in a number of areas including allocation of resources to strategic versus open competitions and in such issues as the establishment of new panels, the lack of a transparent and agreed process will be limiting. This has clearly led to some disillusionment in the scientific community about the role of strategic research. This could be quickly rectified. On balance, however, this Institute has been very successful and should take a larger role in the deliberations about Infection and Immunity funding across the whole of CIHR.



Institute of Musculoskeletal Health and Arthritis (IMHA)

Breadth of Research in This Area

Mandate of Institute: IMHA's vision is to sustain health and enhance quality of life by eradicating the pain, suffering and disability caused by arthritis, musculoskeletal, oral and skin conditions.

Status of This Area of Health Research in Canada

Overall Impression:

- The overall impression of this Institute is good.

Key Strengths:

- Success in partnering with other organizations and industry;
- Integration of representatives from the research community;
- Excellence;
- Having an administrative model where the Assistant Director is based in Ottawa (maintains corporate history when the Scientific Director changes);
- New programs developed: (1) that increase research in health services; (2) across pillars; (3) that embrace diverse research communities;
- KT mechanism established (oral health prevention);
- Well defined short- and long-term strategic plan which identifies approaches to meet goals.

Key Weaknesses:

- Turnover of Scientific Directors and members of their IABs;
- Communication across Institutes and with the research community (e.g., complexity of CIHR website);
- The peer review committees with small research communities have difficulties recruiting and assigning reviewers due to many conflicts of interest and “burn-out”;
- Not enough activities in all pillars;
- Lack of clarity of the relationships across funding programs.



Recommendations for Future Strategy in This Health Research Area:

- Better definition of goals;
- CIHR should develop metrics for assessing;
- Accomplishments and achieving goals;
- Assessing quality of science;
- Demographics;
- Clarify relationships to other funding sources;
- Improve KT to community;
- Improve the review process;
- Expand the capacity for training and career pathways.

Transformative Features of This Health Research Area

There has been considerable progress towards broadening the discipline base, particularly in the areas of skin, oral health and rehabilitation and a very considerable effort into integrating research across four pillars. Knowledge Transfer integration and action has been high, although the metrics for KT are not clearly defined. Ethics needs further development.

Status of Open and Targeted Competition Systems in This Area of Health Research

Only minor changes are needed here, but concern was expressed about the problems with the peer review process which is clearly under strain.

Status of the Institute of Musculoskeletal Health and Arthritis (IMHA)

Overall, the performance of this Institute has been high. There are clearly opportunities for the future in expanding knowledge translation and expanding partnerships with industry and other organizations. The training programs could continue to expand and capacity in some of the specialty areas also needs further work. The Ethics program also could be further developed. In general, however, the impression of this Institute is very good.



Institute of Neurosciences, Mental Health and Addiction (INMHA)

Breadth of Research in This Area

Mandate of Institute: To support research to enhance mental health, neurological health, vision, hearing, and cognitive functioning and to reduce the burden of related disorders through prevention strategies, screening, diagnosis, treatment, support systems, and palliation.

Status of This Area of Health Research in Canada

Overall Impression:

- The overall impression of the review team is excellent.

Key Strengths:

- Integration of research across pillars and content areas (e.g., neuroethics);
- Delivery across diverse societal and cultural groups;
- Excellence and quantity of research productivity;
- Commercialization of scientific discovery.

Key Weaknesses:

- Inability to fully realize strategic opportunities due to: (1) insufficient funds (imbalance between research capacity and resources); (2) young investigators pool; (3) dropout of mid-career scientists; (4) potential fragmentation of integrated programs.
- Lack of coordination with other Canadian funding programs.

Recommendations for Future Strategy in This Health Research Area:

- Increased funding to meet needs of a large, diverse and productive research community;
- Improved alignment and integration with partnership, with CFI and other programs;
- Involve consumers and professional groups;
- Improved reporting documentation of research and translational accomplishments (document return on investment).



Future Opportunities:

- Expand integration between biomedical research, clinical health services and population health programs;
- Outreach and interaction with international community;
- Partnerships with industry;
- Involvement with consumer community.

Transformative Features of This Health Research Area

There has been considerable progress in broadening the discipline base and ensuring integration across the pillars. The strategic research priorities have been clearly laid out and the performance in delivering these have been high. KT has been thoroughly integrated and acted upon in many settings and Ethics has remained a strong feature of the program.

Status of Open and Targeted Competition Systems in This Area of Health Research

This is an example where self-affiliated researchers have an allegiance with the Institute, perhaps in part because the Scientific Director has maintained good communication with these researchers. The open competition appears to require no modification although there is a need for a system for setting priorities for funding.

Status of Training Systems in This Area of Health Research

The training in this area is a very good model for integration across pillars and Institutes and on the whole, no changes are recommended. The training systems are diverse within this Institute and appear to be robust.

Status of the Institute of Neurosciences, Mental Health and Addiction (INMHA)

Overall, the Review Panel was very impressed by the performance of this Institute; it was clearly capable of responding effectively and the Scientific Director has done an outstanding job in creating programs, meeting the mandate of the Institute and working across disciplines. Opportunities exist in the future for alignment with other programs including those with Canada Foundation for Innovation (CFI) and increased involvement with consumers and professional organizations. Improved reporting of research and translational accomplishments need to be a future objective. This is the largest area of biomedical research in Canada including in the open competitions and appears to be operating in an extremely coherent way, in part because the Institute has taken some responsibility for activities within the open competitions.



Institute of Nutrition, Metabolism and Diabetes (INMD)

Breadth of Research in This Area

Mandate of Institute: Focuses on enhancing health, as it pertains to diet, digestion, excretion, and metabolism; and to address causes, prevention, screening, diagnosis, treatment, support systems, and palliation for a wide range of conditions and problems associated with hormone, digestive system, kidney and liver function.

SD and IAB have made the decision to create a single strategic research priority: Excellence, Innovation and Advancement in the Study of Obesity and Healthy Body Weight.

Status of This Area of Health Research in Canada

This is not a particularly advanced research area in Canada, with some exceptions such as the Quebec cohort study and the Laval University satiety study. For this reason, the decision that the Institute would focus primarily on obesity appears to be sensible. The leadership of this Institute is strong with a highly effective Scientific Director, a strong IAB and good peer reviewers. Strategic initiatives have been adequately funded to date.

Transformative Features and Weaknesses of This Health Research Area

A major focus on interdisciplinary research has led to 61% of the projects in this category. The Institute has a strategic initiative that will help build capacity in one major area.

There are several aspects on the Institute that need to be further developed. There has been no serious relationship with pharma and biotech companies in this fertile area for external relationships and leverage has been less than optimal. Funding of new investigators appears to be inadequate and there has been no attention paid to the ethics related to the stigma issue of obesity. Importantly, there is no serious fundamental basic research in this area of merit as yet and this is a serious limitation.

Status of Open and Targeted Competition Systems in This Area of Health Research

The open competitions have not been able to fund all high scoring qualifying grants while the strategic competition is adequately funded. This raises questions about how this balance was struck, particularly in the light of weak basic science in this area.



Status of Training Systems in This Area of Health Research

Minor changes are needed. Training approaches appear appropriate to the varied audiences involved in this program. Young Investigators need more support particularly in the start-up phase.

Future Opportunities

A continued focus on this area of strength is wholly appropriate and there needs to be expansion into other priority areas within the mandate and expansion of KT as funded research matures. Ethics needs to be further developed. The major question for this Institute is whether the singular focus on obesity can and should be maintained now into the future. More effort also has to be made in evaluation of the research that is already funded. The lack of support for pillar 1 investigators is probably inappropriate given the importance of this field in better understanding of disease pathogenesis.



Institute of Population and Public Health (IPPH)

Mission

The stated mission of the Institute is “to support research into the complex interactions (biological, social, cultural, environmental) which determine the health of individuals, communities and global populations; and the application of that knowledge to improve the health of both populations and individuals, through strategic partnerships with population and public health stakeholders, and innovative research funding programs.” Its focus on population is critical for informed health policy. Decision-making for health requires knowledge about the extent and distribution of risks in populations rather than in individuals, because policy-making must take into account the frequency of problems in populations and subpopulations as well as the magnitude of the contribution of each one to ill health.

While Canada has had some very strong population health programs in individual provinces and universities, there are no national or provincial academic structures dedicated to public or population health. There are few universities in which the basic public health disciplines are taught, few people trained at the doctoral level in public health. Therefore, there is no unified advocacy group for public health or population sciences. Canada, however, has been an intellectual leader in the area of Population Health. Starting with the Lalonde report and continuing with Population Health and Human Development Programs developed at the Canadian Institute for Advanced Research, Canada has led the international community in advancing ideas related to Population Health. This Institute represents one of the first national efforts to institutionalize this important sector of research.

The IPPH has made an important contribution to expanding public health and population-based research by means of its programs, building capacity in investigators trained in public health, and by its collaborations with other Institutes and government agencies, and has elevated population health issues to a higher level of interest and immediacy.

Accomplishments

The key accomplishments the review committee found were:

- In a short time, the IPPH has had a significant impact on capacity building in population sciences, and on articulation of population health principles that are being integrated into the programs of other research Institutes;
- Created seven interdisciplinary centres, three of which are located in underserved regions of Canada;



- Supports the research of important cohort studies on health during the life course, namely the Canadian Lifelong Health Initiative that will tell us much about development and aging;
- Delineated deficiencies in the public health systems of Canada prior to SARS and deficiencies in as well as potentials for use of databases in population-based health and health services;
- Provides Canadian scientific leadership to a global health collaborative initiative with scientists in developing countries.

Key Strengths

- Strong leadership by its Director;
- Interdisciplinary focus;
- Good linkages to the Health Services Institute, and Public Health Agency and universities;
- Has begun to develop important linkages between public health practice and university scholarships.

Key Weaknesses

- Can fund innovation only on a small scale;
- Cannot go to scale in program projects, e.g. linking biology with population sciences;
- Unable to fund adequately cross-cutting initiatives in health disparities, due to lack of a unity of focus across a myriad of interest groups, and lack of data within and across provinces;
- Absence of cohort studies and funding limit studies of gene/environment interactions, a major priority in population sciences;
- Needs to make a greater distinction between population health focused on aggregations at the individual level (e.g. social determinants of health) and public health with a population focus (e.g. societal determinants of health);
- Interactions between social and population sciences are good, but the IPPH would welcome more input and interaction with biological sciences.

Balance Between Open and Targeted Competition Systems

- The review group believed that the balance was appropriate, but noted that with the level of available funding, larger multidisciplinary projects were unlikely to be funded, and yet are crucial in the population sciences.
- The Institute has little “ownership” of research funded in the Open Competition system, and no ability to shape research priorities beyond the strategic funding initiatives.



Ethical Concerns

- While ethical issues were not part of the discussion, the issue of regulations on privacy of health and other population records was. Population sciences have the potential to link medical and social and economic data and study the social and environmental determinants of ill health. Yet concerns were raised that unless careful planning were done, privacy regulations might make it impossible to carry out many important population-based studies of risks to health.

Specific and General Recommendations

- IPPH needs the capacity to fund large grants that support interdisciplinary work and to take on large scale studies and program projects integrating biology, epidemiology and social sciences to address population health issues.
- In the area of training, there appears to be a high demand for its training programs, but consideration should be given to establishing schools of public health or other formal training incorporating all the disciplines relevant to rigorous training in population and public health, and public health practice.
- Capacity to respond to new challenges is limited. The available resources are well used, but limit opportunities, and consideration should be given to increasing resources for this Institute.
- A concern raised was that while there was support for new investigators, and through panels for outstanding senior investigators, there was a potential gap in mid-career support that needs to be considered.
- There is a need to increase communication with other agencies about the mandate and programs of the CIHR in general, and the IPPH. Consideration should be given to the CIHR creating a professional communications program to make the contributions better known to policy-makers and the public.
- Canada has some of the richest data on population health in the world, yet access to provincial health data is highly restricted and unavailable to many competent researchers in population, health policy and health services. A major effort should be made to make these databases available for study and research through a central mechanism and at reasonable price. Further, it should be possible to link databases for public health, health care outcomes, adverse effects and costs to create useful linked databases for the nation. There is value on the CIHR directing greater attention to developing appropriate metrics for health that will allow databases to be amenable to uniform study and evaluation. Much knowledge paid for by the public of Canada is not being used to the maximum to create knowledge, best practices and cost savings.



- Greater attention should be given to evaluation of research funded in the Open Competition and strategic initiatives, and to communicating the results of the research electronically to interested audiences.

Summary

The review team was very impressed with the agenda and strategic planning that the IPPH has undertaken in a very short time. They are making excellent progress in accomplishing their primary aims. While many other Institutes benefit from the long-term support of previous Medical Research Council (MRC) collaborations, the IPPH has started to build with only the basic building blocks for an Institute. We support their efforts with the very highest levels of enthusiasm. Additionally, the IPPH has made excellent use of collaborations with other agencies and programs. Their work with the Public Health Agency holds great promise for integrating research and practice activities for Population and Public Health across Canada. Similarly, they seem to have solid relationships with investigators funded through the open competitions of CIHR. Canada has taken a bold leadership role in the conceptual development of identifying determinants of population health. The IPPH is in many ways the incarnation of this idea. We are impressed with its accomplishments to date and look forward to its future.





Appendix 2

International Review Panel Members



John I. Bell

Chair - International Review Panel

Regius Professor of Medicine, Oxford University, Oxford, UK

A Canadian Rhodes Scholar, Professor Bell trained in medicine at Oxford and did postgraduate work in London and at Stanford University. At Stanford, his interest in immunology and genetics led to research on susceptibility to autoimmune diseases. Returning to Oxford as a Wellcome Trust Senior Clinical Fellow in 1987, Bell assumed the Nuffield Professorship of Clinical Medicine there in 1992 where he led the expansion in biomedical research. A member of Oxford University Council, he became the Regius Professor of Medicine in 2002. He is President Elect of the Academy of Medical Sciences.

Professor Bell has pioneered the development of research programs and clinical research in genetics and genomics across the UK. The founder of the Wellcome Trust Centre for Human Genetics, Bell's research has contributed to a clearer understanding of genetic determinants of susceptibility in Type 1 diabetes and rheumatoid arthritis and also the molecular origins of immune activation. He has helped develop genomic methodologies in the area of structural genomics, ENU mutagenesis and genetics.

Professor Bell sits on a wide range of biomedical research advisory panels in Canada, Sweden, Denmark, France, Singapore and the UK, including AstraZeneca (1997-2000) and Roche Palo Alto (since 1998) and has been a non-executive Director of Roche AG since 2001. He has been a founding Director of three biotechnology start-up companies, a member of MRC-UK Council and a Council Member of the Academy of Medical Sciences. He is a Board Member of the UK Clinical Research Collaboration and chairs the Science Committee of UK Biobank and the Oxford Health Alliance as well as other Oxford-based research boards.

Dr. Elizabeth Barrett-Connor

Professor and Division Chief of Epidemiology

Department of Family and Preventive Medicine

University of California, San Diego School of Medicine, La Jolla, USA

Dr. Elizabeth Barrett-Connor's research addresses healthy aging with a particular focus on gender differences and women's health. As a professor, principal investigator in several multi-centre clinical trials, and the author of more than 600 publications, Dr. Barrett-Connor's pioneering work has involved cardiovascular disease, diabetes, cancer, osteoporosis, memory loss and hormones. She is also the founder and Director



of the Rancho Bernardo Heart and Chronic Disease Study, begun in 1972 and continuously supported by the NIH.

A Master of the American College of Physicians of Medicine and a member of the Institute of Medicine, Dr. Barrett-Connor has received numerous awards and served as President of the Epidemiology Section of the American Public Health Association; President of the Epidemiology Council of the American Heart Association; President of the Society for Epidemiologic Research; President of the American Epidemiological Society; Member of the Armed Forces Epidemiology Board, and a member of the Advisory Council of the National Institute on Aging.

Lisa Berkman, PhD

Professor, Harvard School of Public Health

Department of Society, Human Development and Health, Boston, USA

Lisa Berkman is the Thomas D. Cabot Professor in Public Policy, a professorship established to address health-related public policy issues at the Harvard School of Public Health. She is chair of the Department of Society, Human Development and Health and chair of the Harvard Center for Society and Health. Dr. Berkman is an internationally recognized social epidemiologist whose work focuses extensively on psychosocial influences on health outcomes. She edited *Social Epidemiology*, the first systematic account of the field of social determinants of health.

Dr. Berkman's primary studies are large prospective longitudinal cohort studies, such as the Established Populations for the Epidemiologic Study of the Elderly studies (EPESE) and the MacArthur Foundation Research Network on Successful Aging. She is past president of the Society for Epidemiologic Research and a member of the Institute of Medicine.

Barry R. Bloom

Dean of the Harvard School of Public Health

Joan L. and Julius H. Jacobson, II, Professor of Public Health

Harvard University, Boston, USA

Barry R. Bloom is widely recognized for his scientific work in infectious diseases, vaccines and international health. With an AB from Amherst College and a PhD from Rockefeller University, he became a White House consultant on International Health Policy and an Investigator at the Howard Hughes Medical Institute. Bloom was also President of the American Association of Immunologists (1984) and President of the



Federation of American Societies for Experimental Biology (1985). He has served on several national NIH committees, on the US National Vaccine Advisory Committee, and on the Scientific Advisory Board of the National Center for Infectious Diseases at the Center for Disease Control. His awards include the first Bristol-Myers Squibb Award for Distinguished Research in Infectious Diseases, the John Enders Award of the Infectious Diseases Society of America (1994), and a share of the Novartis Award in Immunology (1998).

Bloom is currently a member of the WHO Global Advisory Committee on Health Research, a member of the National Academy of Sciences, the Institute of Medicine, the American Philosophical Society, the Ellison Medical Foundation Scientific Advisory Board, and the Scientific Advisory Board of the Wellcome Trust Center for Human Genetics in Oxford, UK, among others.

Gérard Bréart

**Director, Epidemiology of Maternal and Child Health
INSERM Unité 149, Maternité - Hôpital Tenon, Paris, France**

Since joining the Institut national de la santé et de la recherche médicale as a researcher in 1976, Dr. Bréart has combined his interest in epidemiology and statistics with a commitment to reducing maternal and neonatal mortality and morbidity. Over the years, he has held numerous posts in INSERM including Research Director and member of Governing Council. Presently the Director of a research unit in epidemiology in perinatal and women's health at the Hôpital Tenon, Bréart is also an Adjunct Professor in the Department of Maternal and Child Health at the School of Public Health at the University of North Carolina, Chapel Hill.

Bréart has been an educator, research administrator and member of the French National Committee on Ethics. He is also the past President of the Association of French-speaking Epidemiologists and the French Society of Perinatal Medicine. Dr. Bréart has authored and co-authored over 260 indexed publications.

Mrs. Lynda S. Cranston

President and CEO, Provincial Health Services Authority, Vancouver, Canada

Since 2002, the former first CEO of the Canadian Blood Services has served as President and CEO of British Columbia's Provincial Health Services Authority (PHSA). This agency plans and delivers highly specialized provincial health services through the BC Cancer Agency, BC Centre for Disease Control, BC Drug and Poison



Information Centre, BC Provincial Renal Agency, BC Transplant Society, Forensic Psychiatric Services Commission, and several hospitals involved with women's and children's health.

A recipient of numerous awards, including being named one of Canada's Most Powerful Women in 2004 and 2005, Mrs. Cranston is on the board of the Canadian Healthcare Association, Comprehensive Care International, and is President of the Association of Canadian Academic Healthcare Organizations. She is past Chair of the Board of the Health Employers Association of BC, and was a member of the Premier's Advisory Council on Health in Alberta.

Ms. Karen Davis

President, The Commonwealth Fund, New York City, USA

Karen Davis is president of The Commonwealth Fund, a national philanthropy engaged in independent research on health and social policy issues. Ms. Davis assumed the presidency of the fourth-oldest private foundation in the country on January 1, 1995. Established by Anna M. Harkness in 1918 with the broad charge to enhance the common good, the Fund seeks ways to help Americans live healthy and productive lives, giving special attention to those groups with serious and neglected problems. She is a nationally recognized economist, with a distinguished career in public policy and research. Before joining the Fund, she served as chairman of the Department of Health Policy and Management at The Johns Hopkins School of Public Health, where she also held an appointment as professor of economics. She served as deputy assistant secretary for health policy in the Department of Health and Human Services from 1977-1980, and was the first woman to head a US Public Health Service agency.

Dr. Jeffrey M. Drazen

Editor-in-Chief, New England Journal of Medicine, Boston, USA

Dr. Drazen was born in Missouri, attended Tufts University and Harvard Medical School, and served his medical residency at Peter Bent Brigham Hospital. He has served as Chief of Pulmonary Medicine at Beth Israel Hospital, Chief of the Combined Pulmonary Divisions of Beth Israel and Brigham and Women's Hospitals, and Chief of Pulmonary Medicine at Brigham and Women's Hospital. His research has defined the role of novel endogenous chemical agents in asthma, leading to four new licensed pharmaceuticals. In 2000, he became Editor-in-Chief of the New England Journal of Medicine. During his tenure, the Journal has published major



papers advancing the science of medicine, including the first descriptions of SARS and papers modifying the treatment of cancer, heart disease and lung disease.

Professeur Jacques Glowinski

Titulaire de la chaire de neuropharmacologie

Collège de France, Paris, France

Internationally recognized as one of the founders of neuropharmacology in France, Professor Jacques Glowinski has spent nearly forty years working in the field of neurotransmission and particularly on central monoaminergic systems. His investigations on dopaminergic systems had a great clinical impact on Parkinson's disease and has also consolidated the dopamine hypothesis of schizophrenia. Trained at the Pasteur Institute and then at the NIH (USA) with the Nobel prize winner J. Axelrod, J. Glowinski is the Director of an INSERM unit (Institut national de la santé et de la recherche médicale), in which numerous young scientists received their training. J. Glowinski was a Research Director of INSERM and is now Professor at the Collège de France (Neuropharmacology chair) as well as President of this Institution. He is also a member of the French Academy of Science. He has received several international scientific honours and awards including the Loundsberry Prize and more recently the prestigious prize of Medical Research and the INSERM Prix d'honneur. He received an honorary Doctorate PhD from the Université de Montréal in 2003.

Steven R. Goldring, MD

Professor of Medicine, Harvard Medical School

Chief of Rheumatology, New England Baptist Hospital and Beth Israel

Deaconess Medical Center, Boston, USA

A graduate of Washington University School of Medicine, St. Louis, Missouri, Steven Goldring completed his residency at Peter Bent Brigham Hospital and his rheumatology training at the Massachusetts General Hospital in Boston.

His research focuses on bone and cartilage biology, osteoporosis and cytokines and the role of inflammatory mediators in bone and cartilage loss in rheumatoid arthritis and other inflammatory disorders.

Currently the Director of Research of the New England Baptist Bone and Joint Institute Laboratory at Harvard, Goldring is the past Secretary-Treasurer of the



American Society of Bone and Mineral Research and has served on the executives of several NIH committees and conferences related to bone biology and arthritis.

Dr. Goldring has received several national awards for his work in arthritis and rheumatology as well as Paget's Disease. He is a member of the American College of Rheumatology, the American Society of Bone and Mineral Research, International Bone and Mineral Society and the Orthopaedic Research Society. Goldring is an Associate Editor of Arthritis Research and a member of the editorial boards of Bone and the Journal of Bone and Mineral Research.

Dr. Lawrence W. Green

**Adjunct Professor, Department of Epidemiology and Biostatistics
University of California, San Francisco, San Francisco, USA**

Prof. Lawrence W. Green leads the Social and Behavioral Sciences Program at the University of California at San Francisco Comprehensive Cancer Center. He recently retired from the Center for Disease Control as Distinguished Fellow/Visiting Scientist and Director of the Office of Science and Extramural Research. He has served on the medical and public health faculties at Berkeley, Johns Hopkins, Harvard, Texas, UBC, and Emory Universities. He is a past President and Distinguished Fellow of the Society for Public Health Education, recipient of the American Public Health Association's highest awards, the Distinguished Career Award and Award of Excellence, and the American Academy of Health Behavior Research Laureate Medal.

Dr. Thomas Greenfield

**Alcohol Research Group, National Alcohol Research Center
Public Health Institute, Berkeley, USA**

Thomas Greenfield directs the National Alcohol Research Center, is the Senior Scientist and Executive Director of the Alcohol Research Group (ARG) and is an Adjunct Assistant Professor in the Department of Psychiatry at the University of California at San Francisco. His interest in epidemiology of alcohol use, treatment and prevention, measurement methodology and policy studies have involved him as a Principal Investigator in projects related to alcohol consumption, the mandate of alcohol warning labels and a study of ethnic and social influences on alcohol mortality.

After earning a PhD in clinical psychology at The University of Michigan, Dr. Greenfield spent eight years as a researcher at Washington State University and



then became Associate Director for Research at the Marin Institute for the Prevention of Alcohol and Other Drug Problems. At ARG he is also responsible for National Alcohol Surveys, held every five years. He is an Assistant Editor of the journal *Addiction* and former Vice President and current Secretary of the Kettil Bruun Society for Social and Epidemiological Research on Alcohol.

Dr. Jack Guralnik

**Chief, Epidemiology and Demography Section
National Institute on Aging, Bethesda, USA**

Dr. Jack Guralnik is Chief of the Intramural Laboratory of Epidemiology, Demography and Biometry at the National Institute on Aging. He obtained his M.P.H. degree from the University of California, Berkeley, in 1982 and his PhD in epidemiology in 1985. He is Board Certified in Public Health and General Preventive Medicine. He has been in the intramural epidemiology research program at the National Institute on Aging since 1985. His primary areas of interest in the epidemiology of aging include the study of physical functioning and disability, the prevalence and impact of multiple co-existing chronic conditions, factors associated with healthy aging, methods of assessment of health and functional status, and trends in demographic and health status characteristics of the older population. He has published over 325 journal articles and book chapters in these areas of aging research and has taught and lectured extensively in the US and abroad.

Professor D'Arcy Holman

**Centre for Health Services Research, School of Population Health
The University of Western Australia, Nedlands, Australia**

Professor D'Arcy Holman holds the Foundation Chair in Public Health at The University of Western Australia School of Population Health. He is known for his strategic contributions to health services research, as an expert adviser to governments and community organizations. He leads the WA Data Linkage Project. He has published over 370 works and attracted over Aus\$30 million in grants. His research interests focus on the utilisation and outcomes of health care, particularly using applications of data linkage and spatial analysis. In 2003, he was awarded the Centenary Medal of Australia for his services to the health system.



Dr. Edward R.B. McCabe

**Department of Pediatrics, David Geffen School of Medicine
University of California, Los Angeles, Los Angeles, USA**

Edward R.B. McCabe, MD, PhD, is Professor of Pediatrics and Human Genetics, David Geffen School of Medicine at UCLA, and Physician-in-Chief of the Mattel Children's Hospital at UCLA. He serves as Co-Director of the UCLA Center for Society and Genetics, an interdisciplinary group committed to exploring the interface between and co-evolution of culture and science. A pediatrician and geneticist involved in basic research and policy development, Dr. McCabe was elected to the Institute of Medicine in 2001. He was a Member of the Human Cloning Panel of the National Academy of Sciences (2001-2002), and Chair of the US Health and Human Services Secretary's Advisory Committees on Genetic Testing (1998-2002) and Genetics, Health and Society (2002-2004).

Eric M. Meslin, PhD

Director, Indiana University Center for Bioethics, Indianapolis, USA

Eric Meslin is Director of the Indiana University Center for Bioethics, Assistant Dean for Bioethics, Professor of Medicine, and Professor of Medical and Molecular Genetics in the Indiana University School of Medicine. He is also Professor of Philosophy in the School of Liberal Arts. From 1998-2001, he was Executive Director of the US National Bioethics Advisory Commission (NBAC), which was established by President Bill Clinton to advise the White House and the federal government on a range of bioethics issues including cloning, stem cell research, international clinical trials, and genetics studies. Eric has a PhD from the Bioethics Program in Philosophy at the Kennedy Institute of Ethics, Georgetown University in Washington, D.C., holds academic positions at the University of Toronto and at the University of Oxford and has authored more than 80 publications.

Pamela Mitchell, PhD, CNRN, FAAN

**Associate Dean for Research, School of Nursing, University of Washington
Seattle, USA**

An Elizabeth S. Soule Professor at the University of Washington, Dr. Mitchell teaches management of clinical effectiveness and functional approaches to clinical neuroscience. She is also an Adjunct Professor, Department of Health Services, SPHCM and Director, Center for Health Sciences Interprofessional Education Biobehavioral Nursing and Health Systems.



Her research for the past twenty years has involved investigation of fundamental physiologic factors influencing the responses of critically ill neurologic / neurosurgical patients to ordinary nursing care activities with an eye to enhancing their recovery. Other research focuses on how the organization and delivery of critical care influence patient outcomes, with particular emphasis on the impact of interprofessional education and practice.

Dr. Mitchell chairs the Initial Review Group, National Institute of Nursing Research, serves on the Advisory Council to Triservice Nursing Research, and serves on the Steering Committee for the Agency for Health Care Research and Quality Patient Safety Initiatives.

Arnold Munnich

Head of Genetic Services, Hôpital Necker-Enfants Malades, Paris, France

Biochemist, paediatrician and geneticist, Dr. Arnold Munnich's research and prenatal counseling have helped hundreds of French families affected by genetic illnesses. He and his team have isolated and identified approximately 30 genes responsible for a variety of genetic diseases affecting children.

Munnich received his doctorate in genetics in 1988 and has taught genetics at the University of Paris since 1989. Since 1994, he has been the Director of the Children's Genetic Disease Unit at the Hôpital Necker-Enfants Malades and Director of l'Unité de recherches sur les handicaps génétiques de l'enfant, INSERM, U-393.

A former Senior Researcher at the Institut national de la santé et de la recherche médicale (INSERM) and member of the INSERM Scientific Commission no. 1 (CSS 1) from 1987-1991, Munnich received the prestigious Grand Prix INSERM in 2000 among other awards. He has published extensively, serves on the editorial boards of numerous genetics journals and is a member of the French Académie des sciences, the Board of the United Mitochondrial Disease Foundation and other international organizations.

Dr. Eric N. Olson

Professor and Chairman, Department of Molecular Biology, University of Texas Dallas, USA

Dr. Eric Olson received a B.A. from Wake Forest University, Winston-Salem, N.C., and a PhD from Bowman Gray School of Medicine of Wake Forest University. After a



postdoctoral fellowship at Washington University School of Medicine, he joined the Department of Biochemistry and Molecular Biology at The University of Texas M. D. Anderson Cancer Center as an Assistant Professor where he rose to the rank of Professor and Chairman. In 1995, he moved to The University of Texas Southwestern Medical Center at Dallas, where he is professor and chairman of the Department of Molecular Biology. He holds the Annie and Willie Nelson Professor in Stem Cell Biology Chair. Dr. Olson is a member of the American Academy of Arts and Sciences, the National Academy of Sciences, and the Institute of Medicine. He has been active on many scientific advisory boards and serves on the editorial boards of numerous scientific journals.

Dr. Roger Perlmutter

**Executive Vice President - Research and Development, Amgen Incorporated
Thousand Oaks, USA**

Dr. Perlmutter is Executive Vice President for Research and Development at Amgen, Inc., the world's largest biotechnology company. Dr. Perlmutter is also a Director of Stem Cells, Inc., a Trustee of Reed College, and Chairman of the Board of Directors of the Institute for Systems Biology, a not-for-profit research Institute based in Seattle, Washington. Prior to joining Amgen in 2001, he was Executive Vice President at Merck and Co. Dr. Perlmutter received his MD and PhD degrees from Washington University (St. Louis) in 1979. Thereafter he pursued clinical training in internal medicine at the Massachusetts General Hospital and at the University of California at San Francisco. In the 1980's, at the California Institute of Technology and at the Howard Hughes Medical Institute at the University of Washington (Seattle) he focused his scientific efforts on the elucidation of signaling pathways governing lymphocyte development and activation.

Bruce Ponder FRCP, FRCPath, FMedSci, FRS

**Cancer Research UK Department of Oncology
University of Cambridge, Cambridge, UK**

Bruce Ponder is Professor of Oncology at the University of Cambridge and Director-designate of the new Cancer Research UK Cambridge Research Institute, which opens in 2006. He is also co-Director of the MRC/Hutchison Cancer Research Centre and of the Strangeways Laboratories for Genetic Epidemiology, also in Cambridge. He trained in internal medicine and medical oncology, and did his PhD on nucleosome positioning in polyoma alongside Tony Pawson at the Imperial Cancer Research



Fund. His research interests have been in developmental biology – clonal organization in mouse chimeras – and in laboratory and clinical aspects of cancer genetics. He was elected FRS for contributions in these fields, in 2001.

Dr. Clifton A. Poodry

**Director of Minority Opportunities in Research Division
National Institutes of Health, Bethesda, USA**

As Director of the Minority Opportunities in Research (MORE) Division at the National Institute for General Medical Sciences (NIGMS), Dr. Poodry develops and implements policies and plans for minority research and research training programs and liaises with NIH, other federal agencies and the scientific community. A native of Tonawanda Seneca Indian Reservation in Western New York, Dr. Poodry earned an MA in Biology at the State University of New York at Buffalo, and a PhD from Case Western Reserve University. A Professor of Biology at the University of California, Santa Cruz, until 1994, Dr. Poodry also served in several administrative capacities. In 1995, he received the Ely S. Parker Award from the American Indian Science and Engineering Society for contributions in science and service to the American Indian community, and in 1999 he was awarded an Honorary Doctorate from The State University of New York in recognition of his scientific accomplishments and his activities on behalf of minority students.

Dr. Elio Riboli

**Professor and Chair, Cancer Epidemiology and Prevention
Department of Epidemiology & Public Health, Faculty of Medicine
Imperial College London, London, UK**

Elio Riboli has an MD degree (1977, Milan), a Master of Public Health (1980, Milan) and a Master of Science in Epidemiology (1982, Harvard, Boston, USA). Between 1978 and 1983, he worked at the National Institute for Research on Cancer in Milan. In 1983, he moved to IARC-WHO in Lyon. In 1989, he initiated the European Prospective Investigation into Cancer and Nutrition (EPIC), which eventually included 26 centres in 10 European countries. Over the past decade, he has coordinated research projects based on EPIC into the role of nutrition, lifestyle, environment, genetics and metabolic and hormonal factors in the etiology of cancer and chronic disease. In November 2005, he took up the post of Professor and Chair in Cancer Epidemiology and Prevention at Imperial College London.



Professor Fiona Stanley, AC

Director, Telethon Institute for Child Health Research
Executive Director, Australian Research Alliance for Children and Youth
Professor, School of Paediatrics and Child Health
University of Western Australia, Perth, Australia

Professor Stanley is the Founding Director of the Telethon Institute for Child Health Research; Executive Director of the Australian Research Alliance for Children and Youth; and Professor, School of Paediatrics and Child Health at the University of Western Australia. Trained in maternal and child health epidemiology and public health, Professor Stanley has spent her career researching the causes of major childhood illnesses and birth defects. For her research on behalf of Australia's children, she was named Australian of the Year in 2003. Her research includes the gathering and analysis of population data for epidemiological and public health research; the causes and prevention of birth defects and major neurological disorders, particularly the cerebral palsies and spina bifida; patterns of maternal and child health in Aboriginal and Caucasian populations; various ways of determining the developmental origins of health and disease; collaborations to link research, policy and practice; and strategies to enhance health and well-being in populations.

Dr. Barbara Starfield

Professor, Health Policy and Management
Johns Hopkins University School of Public Health, Baltimore, USA

Dr. Starfield is University Distinguished Professor of Health Policy at the Johns Hopkins University. Her work focuses on understanding the impact of health services on health, especially with regard to the relative contributions of primary care and specialty care, using both clinical and population-based approaches. Main areas of interest are in primary care, equity in health, health status assessment of children and youth, and case-mix assessment and quality of care. She was the founding and first president of the International Society for Equity in Health.



Dr. Ralph M. Steinman

Henry G. Kunkel Professor & Senior Physician

**The Rockefeller University, Laboratory of Physiology and Immunology
New York City, USA**

Ralph M. Steinman, MD, is Henry G. Kunkel Professor at The Rockefeller University and a senior physician at The Rockefeller University Hospital. He heads the Laboratory of Cellular Physiology and Immunology. In addition to research in fundamental mechanisms of immunity and tolerance, Steinman studies the interface of the immune system with several disease states, including research aimed at developing vaccines and immune-based therapies for tumors, infections and autoimmune diseases. Dr. Steinman is an editor of the *Journal of Experimental Medicine*. He is a member of the US National Academy of Sciences and its Institute of Medicine.

Professor Alan Walker

Department of Sociological Studies, University of Sheffield, Sheffield, UK

Alan Walker is Professor of Social Policy and Social Gerontology at the University of Sheffield, UK. A specialist in social gerontology and social policy, he has been researching and writing on aspects of ageing and social policy, including employment, for over 30 years. He is currently Director of a major multidisciplinary research program in the UK and of the European Research Area in Ageing, a project to develop a European strategy on ageing. Previously, he directed the UK Growing Older Programme, dedicated to promoting research to improve the quality of life in old age, and the European Forum on Population Ageing which, in 2005, developed into the ERA-Aging project. He also chaired the European Observatory on Ageing and Older People. He has published more than 20 books and 300 scientific papers. Recent books include *Growing Older - Extending Quality Life* (2004), *Growing Older in Europe* (2004) and *Understanding Quality of Life in Old Age* (2005) all published by McGraw-Hill.

