



THE ASSOCIATION OF FACULTIES
OF MEDICINE OF CANADA

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DE MÉDECINE DU CANADA

AFMC Submission to Canada's Fundamental Science Review Panel

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Outline of AFMC Submission to Canada's Fundamental Science Review Panel

Preamble:

The AFMC represents the country's 17 Faculties of Medicine comprising 12,000 Canadian health researchers and over 35,000 research trainees. The AFMC is the national voice for academic medicine in Canada. Through innovative research, we promote the discovery of new knowledge and its translation into advances in clinical practice that will improve the health of all Canadians. In addition, our researchers train the next generation of Canadian health professionals and thus ensure that Canada maintains a strong health research enterprise that not only improves the health of all Canadians, but directly contributes to innovation and new technology initiatives contributing to the overall growth of the Canadian economy.

Research and training of health research professionals carried out in constituent medical faculties of the AFMC spans the entire spectrum of human health with strong interfaces with research in the physical sciences and engineering and the social sciences. Accordingly, AFMC has a mandate from the faculties of medicine to provide input and comment on re-envisioning the research enterprise in Canada. As an organization, we have identified a set of recommendations founded on three broad themes, based upon our recently release Research Position paper, that we suggest require both deliberation and implementation to ensure a successful future for Canadian science.

1. Research Strategies and Priorities:

a) Funding Model

Increased research investment is required to strike an appropriate balance between fundamental research to generate new discoveries and the application of such discoveries to advance the health and economic well-being of Canadians. At present, The Canadian Institutes of Health Research (CIHR) is the major funding body for health research in Canada. However, we strongly believe that the current level CIHR funding (~ 800 million) is not sufficient to enable CIHR to fulfil its current commitments to a level necessary to achieve excellence and allow Canada's health research enterprise to achieve its full potential and impact. We base this conclusion on the fact that the current model of CIHR embraces the funding of all domains of health research, while at the same time funding newer large-scale initiatives (SPOR etc.) and partnering with other funding agencies and participating in international collaborations. We believe basic and translational science ultimately drives patient-oriented research and as such these domains should be viewed as being complementary to advancing the health of our populations. Examples of such research include sequencing SARS and vaccines for Ebola viruses, development of stem cell-based therapies, and advancing cancer oncogenomics, where initiatives in basic sciences have driven the capability to implement the betterment of human health. In this respect, it is critical that health services are equipped with a preparedness to respond to significant advances in knowledge and newer technologies - such preparedness may require significant funding.

We are strongly supportive of research that has a "big tent" approach to yield translational output and recognize that inclusive inter-disciplinary research frequently results in more rapid and effective translation of knowledge and innovation. As an organization committed to promoting research as a key driver of the knowledge economy, we believe that funding targeted at innovation is crucial to the delivery of this mission.

Recommendation 1

We recommend the creation of distinct yet complementary emphasis on the research mandates for the entire continuum of health research from that related to delivery of health care. This would include creation of a new Health Research Innovation Fund (perhaps through a Federal-Provincial partnership) as suggested by the Report of the Advisory Panel on Healthcare Innovation in July 2015. A new fund would provide the flexibility to offer a nimble and timely response to emerging and important health research issues such as recent global pandemic crises where Canada has a demonstrated record of outstanding accomplishments. This fund could be also used to invest in emerging transformative, or potential disruptive technologies that stand to advance the health care and economic benefits to Canadians. We support participation and leadership of researchers in decision making related to important funding issues.

b) Strategic Coordination and Integration of Programs

Better coordination is needed between current portals of federal funding which include the tri-councils CIHR, the Natural Sciences and Engineering Research Council (NSERC), the Social Sciences Health Research Council (SSHRC)), the Canadian Foundation for Innovation (CFI), The Canada Research Chairs (CRC) program, the Canada Excellence Research Chairs (CERC) programs, Genome Canada and the Canada First Research Excellence Fund (CFREF). The entire research enterprise would benefit substantially from harmonized policies, requirements and procedures to lighten the ever-increasing burden on researchers and institutions.

Recommendation 2

We recommend the establishment of an inter-agency oversight body, which permits dialogue between the funding agencies, and allows appropriate co-ordination of both infrastructure and ongoing research funding in the most effective way. These measures would also promote harmonization of pre-and post-award management of research funding.

The mandate of such an inter-agency oversight body would also include developing policy that addresses scientific and research integrity and ensuring the principles of diversity are respected and adhered to.

c) Investigator-Driven Research and Funding Challenges

Sustainable operational funding of health research at all career stages based on excellence and a high quality peer-review process is important in ensuring that Canada is competitive internationally in generating new knowledge and in its application to advancing health of its population. Many Canadian faculties of medicine are experiencing substantial problems in attracting and sustaining young faculty in a way that permits faculty renewal, fosters the sustainability of current research programs and allows for the development of innovative new strategic ventures within and between our institutions. Mid-career researchers are also experiencing substantial challenges in maintaining a productive research program due to a lack of mechanisms in place that allow for an orderly transition from a junior, early stage investigator to an established senior researcher. For example, the lack of a mid-career salary award that bridges a Tier 2 CRC (junior) award to a Tier 1 CRC (senior) award serves to underscore some of the issues facing mid-career investigators and institutions that are committed to retaining and recruiting such individuals.

The scientific research enterprise is increasingly inter-disciplinary and these teams of applied multi-disciplinary researchers rely on a cadre of dedicated allied health professionals (e.g. nurses, physiotherapists, pharmacists and chiropractors) working in collaboration with PhD scientists and physicians in the setting of an academic health sciences centre. Yet, these individuals in many instances have no funding support from the hospital/health agency or academic institutions.

Recommendation 3

We recommend the establishment of a dedicated pool of funding for early stage investigators. This includes ensuring sustained research funding for early career investigators (at least 5-7 years post initial appointment) with a dedicated envelope of health research funding. We also support the creation of a national strategy that will support the career development of health researchers along the entire continuum of their careers.

d) Creation of a Structure for Consulting the Research Community

We support establishment of a Council or Academy of advisors drawn from a range of research disciplines which include health, engineering, social, technological and environmental sciences. There are a number of models for the development of such an “Advisory Council” including the European Commission’s recent establishment of a Scientific Advice Mechanism (SAM). Such a Council, or Academy could be chaired by the Chief Scientific Officer for Canada to provide the Government with the highest caliber of independent and authoritative advice on matters related to science. This Council also could serve as “think tank” for deliberating a balance of investments in “Big Science” and traditional streams of investigator(s)-driven research, assess the value of global collaborations to Canada and ensure that social domains of health research continue to be represented in science policy.

Recommendation 4

Create an independent Scientific Advice Mechanism to ensure alignment of scientific thinking and strategy with both capabilities and societal needs.

e) Research Capacity Building for Indigenous Peoples Health

The AFMC believes that the Canadian research enterprise should take a strong leadership role in establishing a health research framework that addresses the needs and aspirations of the Indigenous Peoples, a vulnerable sector of our population that labors under a huge burden of chronic diseases. The current structures and changes disadvantage Indigenous research and researchers (e.g., the peer review process and requirements for matched funding for several granting programs). There is thus an urgent need to establish the pursuit and conduct of high quality Indigenous health research as a national priority and develop a framework of stakeholders to help achieve this.

Recommendation 5

Convene a meeting of important stakeholders (i.e. appropriate Federal Government ministries, the Aboriginal Health Research Steering Committee (AHRSC), CIHR and others) to address the inequities in indigenous health through a strategy that is focused on supporting existing indigenous health researchers and to help develop excellence in health research capacity in areas of need. This strategy may need to include targeted research funding to kick-start high quality research and capacity building in Indigenous Peoples health. The AHRSC, which brings together and shares information with First Nation, Inuit and Métis researchers, as well as non-Indigenous researchers from across the country, would be a valuable resource in facilitating a dialog between researchers and funding agencies.

2. Operational Aspects of Research Funding:

a) Research Funding

In comparison to other G7 countries, Canada spends considerably less on biomedical/health research. More specifically, Canada spends per capita approximately 80% less than G7 countries. For example, although the U.S population is about 10 times that of Canada, the annual budget for NIH for 2016 is over \$30B USD compared to under \$1B CDN for CIHR. While recognizing that the NIH funding envelope includes in part research salaries and other indirect costs, attainment of funding levels that are comparable to the NIH is important if Canada is to attract and retain the best health researchers and to maintain its global competitiveness.

Recommendation 6

A substantial increase in CIHR research funding to fulfil its current mandate of supporting the full spectrum of health research with continued increases that keep pace with funding newer health research initiatives and programs, inflation and purchasing value of the Canadian dollar. We believe an immediate 50% increase in the CIHR budget, with annual 15% increases for the next 5-10 years, is required to mitigate the deficits incurred over this century in supporting core research operations and strategic initiatives.

b) Addressing the True Costs of Research

The development of strategic funding policies or programs that address the issue of full economic costs (FEC) of research and development, including an overhead policy that reflects the realities of institution-based research, is imperative. The United Kingdom (UK) provides an interesting model for indirect costs based on a FEC model, which is worth examining. The UK granting councils provide 80% of the calculated FEC of research which in effect can approximate to 60-70 % indirect costs to institutions. Peer-reviewed funding through charitable organizations that are administered through competitive processes can also attract indirect costs, and consist of separate funding through the Higher Education Funding Council for England (HEFCE) Charitable Support Funding stream, often called the "C-stream". The National Institutes of Health (NIH) in the USA routinely provide indirect costs to institutions in the order of 50% of funding awarded through RO1 grants. In contrast with these other jurisdictions, Canada is very poorly served by a system in which <20% of costs on CIHR grants are covered. Furthermore, the cap on indirect costs substantially impedes the more successful research institutions.

Failure to cover the Full Economic Costs of research has substantial impacts for faculties of medicine which are frequently among the larger research intensive faculties within universities. The overall consequence is that faculties which are successful in obtaining research funding have to find other ultimately costly mechanisms to meet the full economic costs; such mechanisms may include stopping or retarding the process of faculty renewal. Hence success in research presents substantial challenges to the broad mission of our faculties and universities.

Recommendation 7

Implementation of a more effective system for the recovery of full economic costs on research grants including those derived from charitable sources is required.

c) Process for Funding Adjudication

The AFMC fully supports a fair and transparent peer-reviewed process for all research funding (operating grants, salary support programs, traineeships and infrastructure) that is founded on principles of rewarding research excellence and that has a built-in process for accountability of decisions. Such a process requires both external review and face-to-face panel meetings of content experts to ensure transparency and accountability.

A central tenet of the rationale for significant changes to the CIHR peer review system was that the past system was unable to effectively handle the current large number of applications, sustain acceptable positive outcome levels, and allocate sufficient funding to support research excellence in all CIHR tiers. We would suggest that the current high numbers of application submissions is due to several factors: **1)** the very successful and progressive Canada Research Chair program that integrated 2000 world class researchers into the health research system over the past two decades; **2)** that over a 1/3 of all Canadian University Professors have reached age 55 and thus have entered a peak period of productivity for their research programs and are thus seeking maximum funding to support this productivity; and **3)** success rates have declined so significantly that researchers believe they must submit multiple grant applications to ensure that at least some funding is present to support their research programs. The 3rd point suggests that there is a positive feedback process in effect here where as success rates decline, application numbers increase dramatically. Finally, the average grant size is no longer sufficient to run a competitive laboratory- or clinical-based research program. Despite their stated purpose to resolve these problems, the recent creation of both foundation and project grant processes with their accompanying three stage review processes have in our view not addressed these major concerns in any way whatsoever.

Amongst the issues related to funding, it is also important to ensure integration of funding from CIHR, CFI and CRC programs (with cross-talk between organizations) for individual investigators, i.e. one-stop shop so there are no cases where a PI, especially at early career stage, has a salary award but no operating funds or has infrastructure but no dollars to operate this.

Recommendation 8

A thorough review of the peer review process for CIHR funding taking into account stakeholder input and including the inter-agency oversight body (**Recommendation 3**) to ensure integration of various funding streams. We also support a harmonization of funding adjudication and awards between the national organizations dedicated to providing salary support, operating grants and infrastructure funding to researchers.

d) Matching Funds

The requirement for matching funding introduces a set of imbalances into the grant review processes. Specifically, matching external funding may be achieved more effectively in particular disciplines. The process may skew the entry into the grant review process away from particular areas of excellent science or locations where matching funding may be more difficult to achieve

Recommendation 9

Reassess the issue of matching funds (from private, provincial or university sources) and eliminate this requirement or *only* target it specifically for large scale initiatives where there is a pre-agreed formula for provincial-federal partnerships. In many instances, the criteria of excellence may not necessarily apply to provision of the matching funds. We also believe that

elimination of matching funds will improve the regional and institutional disparity in research funding and infrastructure between provinces.

3. Training of Future Leaders in Health Research:

a) Clinician Researchers

Training of physicians occurs best when they are trained in a research rich environment that fosters innovation and creativity. These clinician researchers/scientists, who are versed in multiple disciplines, possess a unique set of skills that set them apart from other health professionals. This makes them an invaluable asset for translating discoveries in medicine into day to day delivery of clinical care. These individuals meet a pressing national need, are economic drivers by early adoption of health care cost reduction strategies-technologies, and as future leaders in health research are crucial in identifying best practices for the delivery of health care, which is changing at a rapid pace. A critical need for medical leadership versed in research was identified in the Report of the Advisory Panel on Health Care Innovation, and as such our clinician scientists in training are the future leaders who will make the discoveries and innovate to improve the health of Canadians. These individuals however face significant challenges in the form of total length of professional training that includes research training, funding during prolonged period of training, post-training debt, future career prospects and life-long mentorship. As an organization dedicated to advancing medical education and life-long learning, we believe that the next generation of health professionals will need research training to become innovative and compete in knowledge-based global economies.

Recommendation 10

In the short term, restore integrated MD-PhD and MD-MPH professional training programs (\$2.6m/year) that are key structural elements for health professionals who are dedicated to the pursuit of research focused careers and will assume the mantle of future medical leadership. In the longer term, establish a national training strategy for clinician scientists (that includes all health disciplines) at all stages of career development. Such a plan would include a) setting national standards and metrics, including oversight, of the continuum for developing an independent clinician scientist; b) supporting active summer studentship programs that often provide medical and other health trainees their first opportunity for exposure to research c) establishing competitive programs in which both students and mentors show exemplary characteristics; d) leveraging opportunities and partnerships to create sustainable support for clinician scientist programs; e) addressing issues of salary and time protection, debt relief and sustainable research funding; f) establishing a mentoring program that spans the entire career track of the clinician scientists' career.

b) Scientists

Training of the next generation of graduate students (PhDs) is critical for the future of health research and economic development in Canada. An increasing number of graduate students in health disciplines are seeking job opportunities outside of Universities and there is a growing need for programs to support career development in other sectors such as industry and business. Training such highly skilled individuals to be fluent in science and business will stand to make Canada an attractive destination for foreign investments in any health-related sector. There have been significant changes to the Tri-Council Trainee Award Programs over the past decade or so. The creation of Vanier and Banting Award Programs, while desirable and effective at rewarding the accomplishments of the “best of the best”,

only serve to benefit an extremely small proportion of the skilled and deserving trainees that are among our most important learners within our medical schools. The offering of trainee support awards should be based on accurate projections of expected personal numbers needed to drive Canada's future excellence in biomedical research globally. Instead, we have witnessed steady erosion in the numbers of Tri-council Masters, PhD and Postdoctoral Scholarships and Fellowships over the past decade. This decline in awards assures that Canada's future in biomedical research will not soar to the heights in the future that it has in the past. Thus it is essential that greater resources be distributed to restoring reasonable capacity building levels of excellent trainees (summer students, graduate students and postdoctoral fellows) that will drive biomedical research excellence in the future and ensure Canada's place a global leader in advancing solutions for the health related diseases that inflict humankind.

Recommendation 11

In the short term, provide increased support through targeted tri-council funding for trainees. *As a longer term strategy*, promote and encourage institutional identification and support of graduate students committed to a career in research and provide appropriate opportunities (including multi-disciplinary training) for those graduate students contemplating careers outside of academia. As a longer-term goal, encourage the Federal Ministers of Health and Science and their provincial partners in developing a pan-Canadian strategy for attracting young minds into science and by providing sustainable support that increases the attractiveness of a career in science and health research.

4. Concluding Comments

The Government of Canada annually invests more than a billion dollars to sustain and grow health research in Canada. Through many successful initiatives, this investment has succeeded in training new researchers and recruiting and retaining bright, successful and experienced investigators to Canada. These successes have also brought a daunting set of challenges. The CIHR, the major funder of health research in our country, has witnessed unprecedented escalation in applications to its open operating grants programs to the point that only a little over one out of 10 grants are funded and the funding success for early career investigators is even more dismal. Thus, many excellent research programs and bright, productive researchers at all stages of their career go unfunded. These funding pressures and a lack of proper co-ordination and integration between the different funding agencies and programs have created significant gaps in the health research environment. Our perspective is that the current system does not maximize the considerable investment that the Government of Canada has made in generating a country-wide excellence in health research but that the situation is remediable. In this submission, we have provided identified key issues that need to be addressed if Canada is to become a global leader in health research. More importantly, we provide specific recommendations that we feel will allow us to advance our health care system and the quality of life for all Canadians.