

***The Health Research Advantage:  
Fostering an Integrated Approach to Innovation in Canada***

**Submission to House of Commons Standing Committee on Finance**

**November 7, 2013**

**Sunnybrook Health Sciences Centre**

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**About Sunnybrook Health Sciences Centre**

One of Canada's largest research and teaching Hospitals, Sunnybrook delivers care to more than 1.2 million patients every year. Sunnybrook strives for excellence in all that we do, while at the same recognizing the importance of investing in a select number of clinical and academic activities which are leading the way internationally and are acknowledged to be preeminent leaders. Sunnybrook's strategic priorities are internationally renowned as delivering highly specialized care and leading in the discoveries and innovations they make, the teaching and learning opportunities they provide, and the unparalleled level of care they deliver.

**Sunnybrook's strategic priorities:**

- Deliver Sunnybrook's brand promise of "innovative care at critical times in the lives of our patients and their families"
- Demonstrate preeminent leadership in the delivery of highly specialized care and are internationally acknowledged to be renowned in the way they improve health outcomes and define the future of complex healthcare
- Lead in the creation of new knowledge across the healthcare system and are acknowledged for research and teaching innovation which changes healthcare practice
- Differentiate Sunnybrook within our academic health sciences centre peer community in both the local and global healthcare marketplace.

Our four strategic priorities are in the areas of Cancer, Heart and Stroke, High Risk Maternal and Newborn Health, and major Trauma and Burns. These areas differentiate Sunnybrook from others in both the local and global health care landscape. They are the focus of reinvestment strategies and receive targeted support from the Sunnybrook Foundation through fundraising.

**The Sunnybrook Research Institute**

Over the last decade, Sunnybrook has become one of the top six academic health science centres in Canada. As the research enterprise of the hospital, Sunnybrook Research Institute (SRI) leads in discovery medical research and in translating discoveries into better models of prevention and care.

**Our vision:** to invent the future of health care. **Our mission:** to create an internationally competitive research enterprise through which we can achieve our aims: to advance the understanding of disease toward its prevention and cure, to improve the quality of care for those we cannot cure and to develop innovative treatments.

Home to more than 1000 scientists, clinician scientists, technical support staff and trainees working in 500,000 sq. ft. of state-of-the-art infrastructure, research expenditures at the institute topped \$125M in 2011-'12. These resources are deployed across three research platforms (Biological Sciences, Evaluative Clinical Sciences and Physical Sciences) that align with Sunnybrook's eight clinical programs (Brain Sciences; Holland Musculoskeletal (MSK); Odette Cancer; Schulich Heart; St. John's Rehab; Trauma, Emergency & Critical Care; Veterans & Community; and Women & Babies). This structure enables the natural massing of scientists working on projects requiring multidisciplinary approaches and ensures alignment and integration with hospital function.

**Sunnybrook** welcomes the opportunity to work with the government as it engages all sectors and works in partnership to build support for health research, the collateral healthcare system and economic upsides.

### **The Context: *Discovery to clinical impact through the medical market place***

Canada's health research foundation is strong. Our *per capita* research productivity and impact consistently rank in the top five globally in major disciplines; the "brain drain" that once threatened the security of our future talent pool has given way to dynamic global movements of trainees and professionals, who now view Canada as a health research destination; our research institutions and infrastructure are at the cutting-edge of technology and design; and, the Canadian public places a high priority on—and faith in—our health research enterprise.

**Research drives innovation.** The role of technology development and commercialization, and the interface with the private sector, are foundational to capitalizing on the material public sector investment through the Tri-Council in health research. Technology development and commercialization underpin the translation of discovery to product, whether that product is a new procedure, biological therapeutic or device, and the transfer of this new knowledge to the clinic, where it ultimately has an impact on the health care system. The increased ability to translate findings to the bedside, indeed the curbside, provides a transformational opportunity. The advances in the development of improved modalities of prevention, diagnosis, palliation and cure promise advances in our capacity to address the most debilitating illnesses affecting Canadians.

**Innovation drives growth in productivity.** In today's knowledge-based economy productivity gains will not be as much a result of working harder as they will be of working smarter—of innovation. Research drives innovation; and health research, uniquely, lays the foundation for a more innovative and productive society by: 1) improving health, 2) training the next generation of health researchers, 3) building an evidence-based, sustainable system that delivers state-of-the-art healthcare, and 4) driving the development of new products and services, attracting investment and creating jobs for Canada's highly trained workforce.

Key to success is a seamless integration and resourcing of all stakeholders across the continuum of activity: from initial discovery through to technology development, clinical trials and commercialization, culminating in the implementation of new treatments and the establishment of the next set of best and most cost-effective practices in medicine.

A balanced investment in each domain along the continuum of activity is critical to a functional ecosystem. Discovery research and technology development *push* must be balanced with *market pull*. This is an important concept; it positions research funding as an **investment** rather than as an **expenditure**. It is government's role to ensure that the ground is fertile for the *creation* and *commercialization* of new ideas by investing in state-of-the-art research and facilitating linkages between research and industry. The return on investment must be measured in better health, better and more cost-effective health care and the development of a (Canadian-based) health research industry.

Canada spends more than \$200B annually on healthcare and medical research; arguably our nation's largest "business". We are not monetizing the opportunities presented through this investment. Solutions must harness and strengthen the interdependencies across government, academia, industry and the not-for-profit/charitable sector; recognize that innovations in health technology cannot flourish without innovations in the structure of the healthcare system and the context in which healthcare is delivered; and take a balanced approach to investment in fundamental and applied health research across the discovery to practice continuum – through the medical market place.

Sunnybrook has created an international hub for life sciences, providing functional integration of researchers, clinicians, business and patients to translate discovery into use for medical innovation within the Ontario and Canadian health care systems and beyond. Over the last decade we have spun-off more than 10 companies based on our intellectual property; these companies are at various stages of evolution, some already acquired by multi-nationals. All are dedicated to the creation of new therapeutics or medical devices that required the rigors of private sector supported technology development and

commercialization.

The three recommendations that follow are provided within the context of the continuum: *discovery to clinical impact through the medical market place*; and draw from Sunnybrook’s direct experience in its navigation. **Where are the gaps and how may they be addressed toward doing better business, better?**

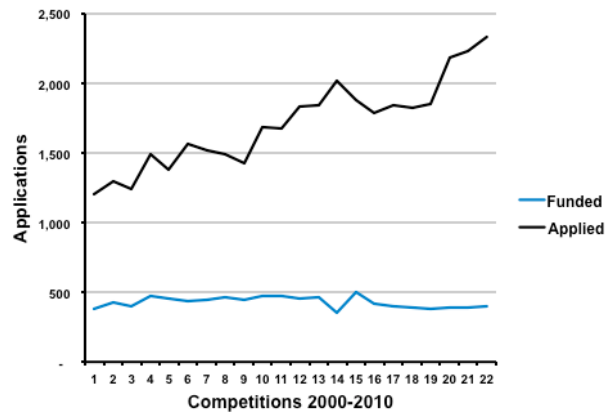
**Fueling the Discovery Engine: the need for balanced investment across the continuum**

We applaud the explicit commitment of the Government of Canada to health research over the last decade, through a series of significant investments, most notably in the Canadian Institutes of Health Research (CIHR), the Canada Foundation for Innovation, (CFI), the Canada Research Chairs Program, Genome Canada, the Networks of Centres of Excellence (NCEs).

In addition to maintaining and improving the health of Canadians, these health research investments have supported our healthcare system and contributed to an innovative and knowledge-based economy that is enabling the commercialization of Canadian research.

Despite the scientific advancement Canada has made through its increased commitment to health research, we are at risk should we conclude that our current investment is sufficient in equipping us to compete in the new global economy. With an expanded mandate and the impact of increased support for infrastructure development through the CFI, coupled with the material and ongoing investment in the Canada Research Chairs Program, the “Tri-Council” agencies comprised of the CIHR, the Natural Sciences and Engineering Research Council of Canada (NSERC), and the Social Sciences and Humanities Research Council of Canada (SSHRC) has flat-lined over the last decade.

The graph at the right shows the number of applications to CIHR, and the number funded for 22 competitions over the last decade. The CIHR is the major, while not exclusive, funder of health research in Canada. The data show that the number of applications has almost doubled, while the number that has been funded has remained constant. The



doubling of applications is related to the implementation of the other federal programs dedicated to sorely needed infrastructure renewal, specifically CFI, and those dedicated to the recruitment and retention of the best scientists, specifically, the Canada Research Chairs program. Both of these programs have been essential to raising Canada’s global contribution to discovery science. However, investment in the Tri-Council has not kept pace, and with better infrastructure and vehicles to recruit more scientists, the inevitable consequences have been realized.

In the absence of additional resources, CIHR cannot keep pace with the foundational research that improves health, alleviates the human and financial burden of disease, builds an efficacious and cost-effective health system and develops innovative products and services within an increasingly competitive global economy. We are at risk of losing ground and jeopardizing the return on material investments in health research already made in the absence of significant, sustained, multi-year growth in CIHR’s base budget. The very nature of research requires investment over time if we are to reap the full health and economic benefits in the future.

❖ **Recommendation # 1**

***A multi-year commitment to increase the Tri-Council base budget by \$300 million over the next 3 years to enable maximum benefit from investments in health research already made.***

## **Supporting the Full Cost of Health Research**

Sunnybrook, along with all research enterprises, is challenged with the ongoing costs of supporting the infrastructure required to provide our scientists with capacity to execute their experiments. The “direct” federal support through the Tri-Council is dedicated to the execution of the research; not the collateral “indirect” expenses associated with essential services including maintaining equipment; environmental services; security; and energy costs. In aggregate these indirect expenses amount to roughly 45% of the direct expenses.

Of note in this regard, and an excellent start, is the “Institutional Operating Fund” (IOF) awarded in conjunction with successful CFI applications. The IOF amounts to 30% of the federal portion of the CFI award and is dedicated to supporting the indirect costs as described above.

The Tri-Council and Industry Canada have made some headway through the implementation of the “Indirect Cost Program” (ICP). However this program requires rebalancing in terms of how resources are deployed and how much support is provided. The challenge is the current goals of the ICP are to not only to support indirect costs, but also to support capacity building at smaller institutions.

Specifically, the ICP deploys resources in support of indirect expenses based on two considerations; total Tri-Council funding; and the jurisdiction in which the research is done. Large institutions are disadvantaged through the implementation of a sliding scale of support from the ICP. On average, larger institutions receive roughly 18% of their Tri-Council direct support in indirect cost support, while smaller institutions can receive up to 90% of their Tri-Council support from the ICP.

While well intentioned, the implementation of this sliding scale of support from the ICP disadvantages those institutions at which the majority of research is done. As for the CFI-IOF, and granting agencies in foreign jurisdictions, notably the US National Institutes of Health, those institutions doing the work need to benefit from the ICP directly and proportionately, otherwise the capacity to execute the work will be compromised.

### **❖ Recommendation #2:**

***To ensure the needed indirect support of research where it happens, the indirect cost program should deploy a flat 45% of the amount of awarded Tri-Council funding to all awardees.***

## **Enabling Public-Private Sector Partnerships: accelerating technology development and commercialization**

Global industry has entered an era of unprecedented consolidation and corporate re-engineering. Multinational enterprises (MNEs) in pharma, biotech and medical device manufacturing are joining the shift to public sector partnerships that are focused on ensuring the scope and depth of their innovation pipelines.

Restructuring by MNEs is motivated by a number of related issues. Notably is the failure of their traditional internal R&D efforts to produce the next generation of blockbuster drugs, exacerbated by patent expirations. This has accelerated their consolidation of programs and sunset of ineffective programs, a refocus on the identification of new disease areas of interest, and establishment of partnerships with the public sector toward ensuring scope and depth in pipeline activities.

**The FedDev Program is a key initiative dedicated to accelerating the development and commercialization of Canadian technologies through private sector partnerships.** The goal is to engage private sector partners who are incented through public investment to invest in tailored projects they establish with public sector partners. The recent announcement of the \$900M renewal of the FedDev Program over the next 5 years is propitious.

Sunnybrook Research Institute capitalized on the last round of FedDev funding and was awarded \$6.9M

through this program toward the establishment of a cluster dedicated to *Image Guided Therapeutics*. The global diagnostic medical imaging market was anticipated to be worth almost \$25B in 2012, with image-guided navigation expected to be worth an additional \$600M by 2015.

The medical imaging industry is advanced, offering high quality professional and manufacturing jobs. Canada, and Southern Ontario in particular, is world renowned for its medical imaging research capability; Sunnybrook, for example, has been sought out for research partnerships with three of the four largest multinational medical imaging companies, as well as numerous partnerships with medical device and pharmaceutical companies.

Despite our research talent, the value of this industry, and Canada's appetite for this technology (Canada accounts for 3% of global spending on medical devices of which Medical Imaging is a subset), our medical device industry receives less than 1% of medical device global revenue.

Part of this shortcoming is attributable to an historical lack of a medical imaging and medical device cluster. We have had individual successes in companies such as Ultrasonix, Sentinelle Medical, Visualsonics, and Resonant Medical. However, we have not had enough companies growing together to benefit from each other and unable to enjoy the advantages that arise from a critical mass of strong local industry presence.

Sunnybrook, with its partners and through FedDev Ontario's funding, is rapidly building and bringing together medical imaging in Southern Ontario. Sunnybrook has been involved in the creation of 13 companies, accounting for over 15% of total medical imaging companies in Canada. In the past year, under this FedDev initiative, Sunnybrook has continued to take major steps forward that are leading to benefits in both healthcare and in the local economy.

There is much demand for FedDev resources arising from multiple sectors, and **less than 10% deployed in the last round were dedicated to medical research**. As healthcare and supporting medical research represents one of the biggest "businesses" in Canada, we need to continue our focus on vehicles to monetize public investments efficiently. The FedDev program is a key enabler and accelerates our capacity to capitalize on the collateral economic upside of investments in medical research through commercialization; creates high quality jobs; and in turn ensures that the Canadian Healthcare system remains state-of-the-art and best in class.

❖ **Recommendation #3:**

***Toward enhancing our capacity to monetize public investment in health research, increase the deployment of FedDev resources in support of the health research sector to 25% of the pool.***

### **A role for tax incentives in supporting research and innovation: a local benefit**

The Scientific Research and Experimental Development (SRED) Tax Incentive Program has played an important role in supporting private sector R&D in Canada. It has also had a material impact locally at Sunnybrook. In 2010, Sunnybrook took the decision to spin-off the Sunnybrook Research Institute. As an incorporated research entity, wholly owned by Sunnybrook, the research enterprise sought and was granted SRED eligibility. This was transformative. As an academic health sciences centre, all physicians practicing at Sunnybrook are required by covenant of our affiliation agreement with the Faculty of Medicine at the University of Toronto, to belong to a "practice plan". Practice plans title the billable earnings of their members and use this revenue in support of the clinical department's/division's academic enterprise. Much of the research done by Sunnybrook practitioners is SRED eligible. The transformative decision taken by departments/divisions was to reinvest SRED credits directly back into their research enterprise, rather than capitalizing on them for personal gain. This paradigm has resulted in a 20-25% increase in revenue that directly supports the clinical research essential in translating discovery into clinical practice. As such, a key activity in the continuum from discovery to first in human trials and clinical impact has materially benefitted.