

LEVERAGING UP THE CANADIAN ADVANTAGE:

The Hidden Economic and Innovation Engine of
Canada's Research Hospital Sector

Submitted to Canada's Innovation Agenda

September 29, 2016



Executive Summary

HealthCareCAN is the national voice of patient care organizations in Canada including the majority of the country's research hospitals. Research hospitals employ close to 660,000 Canadians, more than 60,000 of whom work in research and innovation. They are the nexus of patient care, training and research. This creates environments for healthcare innovation that contribute not only to health but to the economy.

We commend the Federal Government for its effort to establish an Innovation Agenda that will position Canada as a centre for global innovation. We commend its intentions of redesigning and redefining how it supports innovation and growth. Finally, we commend its recognition of the importance of partnership and coordination with the private sector, provinces, territories, municipalities, universities and colleges, and the not-for-profit sector, including Research Hospitals.

In this submission, we propose that Canada's Research Hospitals offer a unique opportunity to achieve many of the Government's stated innovation goals, while meeting health, economic and quality of life goals as well. We would like to be part of the Innovation Agenda - not just for health - but across all sectors. Research Hospitals are national assets with national and global innovation potential. With this in mind, our submission highlights the role of research hospitals through various success stories. We also provide recommendations in all six of the consultation areas, summarized as follows:

World Leading Clusters and Partnerships:

1. Recognize Canada's Research Hospitals as an innovation sector within the business related innovation agenda by ensuring they are included in all federal innovation and infrastructure programs.
2. Consider a credentialed Research Hospital system that allows for the identification of Research Hospitals and the linkage of resources and accountability for innovation performance nationally.

Global Science Excellence:

3. Increase investments to research and innovation programs and councils, including the federal support to research fund, while improving governance, strategic and operational integration among them.
4. Recognize Research Hospitals as essential partners to the success of universities, colleges and businesses in the health and life sciences.

Entrepreneurial and Creative Society:

5. Reward companies who choose to structure operations around the public healthcare system with tax benefits and procurement opportunities
6. Ensure Research Hospitals are fully eligible applicants and partners in federal funding for innovation networks and clusters including the Cluster Portal and Cluster Innovation Funding.

Ease of Doing Business:

7. Encourage strategic innovation procurement for carefully selected innovations in the health sector and position hospitals appropriately in the innovation ecosystem to retain talent and venture capital.
8. Explore the potential for a Small Business Innovation and Research type program in Canada and encourage a "whole of government approach" to research and innovation in the health and life sciences.

Grow companies and accelerate clean growth:

9. Allow hospitals and health regions to apply and compete for federal green infrastructure funds.
10. Develop technological, knowledge or social infrastructure that allows for the tracking of healthcare related green infrastructure best practices, need, and eventually the scaling of selected initiatives.

Competing in a Digital World:

11. Allow CFI to use funding not only for innovative computational equipment but for modernizing regular digital infrastructure that permits the generation of innovation.
12. Explore the possibilities and infrastructure needed for the use of Big Data in healthcare

Leveraging up the Canadian Advantage: The Hidden Economic and Innovation Engine of Canada's Research Hospital Sector

Introduction

HealthCareCAN commends the Federal Government for its effort to establish an Innovation Agenda that will position Canada as a centre for global innovation. We commend its intentions of redesigning and redefining how it supports innovation and growth. Finally, we commend its recognition of the importance of partnership and coordination with the private sector, provinces, territories, municipalities, universities and colleges, and the not-for-profit sector, including Research Hospitals.

In this submission, our central proposition is that Canada's Research Hospitals offer a unique opportunity to achieve many of the Government's stated innovation goals, while meeting health, economic and quality of life goals as well. We would like to be part of the Innovation Agenda - not just for health - but across all sectors. We believe it is time to leverage Research Hospitals not only as valued patient care organizations, but also as national assets serving as economic and innovation engines with national and global innovation potential. It is time to move with and beyond the traditional triumvirate of universities, colleges and businesses as the only national stakeholders in the Innovation Agenda. International peer reviewed literature on innovation policy supports this movement, and the Federal Government's recognition of the economic potential of Research Hospitals in Budget 2016 would appear to support this as well.^{1 2} With this introduction, we are pleased to respond to the specific questions posed in this consultation.

1. World Leading Clusters and Partnerships: *What is the right model for made in Canada innovation clusters led by business? What are the barriers to Canadian participation in global supply chains? How can business institutions and government attract talent and investment?*

We propose to the Innovation Agenda Panel that Research Hospitals, academic health science centres and the networks that surround them are themselves internationally important innovation clusters. Universities and colleges are intimately dependent on Canada's Research Hospitals and vice versa. Colleges and universities are valued and important partners, but Research Hospitals are separate legal entities with distinct governance, revenue and expense streams and are where the actual clinical research and innovation takes place.³

We therefore encourage the Panel to consider the unique role that Research Hospitals have in building a national, sustainable research and innovation ecosystem. Across Canada today there are Research Hospitals that have already demonstrated the commitment to research excellence and entrepreneurial potential to compete globally.

Did you know...?

Canada is home to over 40 Research Hospitals, some of whom have been invited to set up operations overseas?

Research Hospitals have over 60,000 research scientists, staff and students and employ over 650,000 Canadians.

Research Hospitals account for a \$2.6 billion Research & Innovation sector separate from universities and colleges

It is time to leverage this latent potential to both capitalize locally in terms of providing better healthcare but also commercialize globally on our health and life science capacity by more explicitly tying accountability and new resources for innovation performance together. A working model of this idea is the designated Comprehensive Cancer Centers in the United States, which receive operational funding for the "development of more effective approaches to cancer prevention, diagnosis, and treatment".⁴ In other words, beyond high quality and usual care, these organizations have an innovation expectation in their missions.

In Canada, this may involve designating organizations that would have a "responsibility" to carry out certain "designated functions" related to research and innovation. These organizations would receive designated federal funding to do so but they would also be responsible for demonstrating and reporting on expected results in order to maintain or reapply for funding. HealthCareCAN is in the process of developing and testing indicators that can help to identify such organizations.

The key benefits of tying performance and accountability for innovation would be to stimulate capitalization and commercialization from the health sector and to offset the structural and indirect costs that these organizations carry to pay for their research functions. It would also allow for the ability to extract novel advances of significant economic impact from the intellectual talent pool within them. As one Vice President of Research wrote in the Hill Times: *"With the addition of a small fraction (only two to three per cent) of funding to the health budget, and the expectation of improved health outcomes for Canadians, it could transform the healthcare system"*.⁵ We thus encourage a very deliberate linkage between the Innovation Agenda, the findings of the Federal Healthcare Innovation Advisory Panel, and the Health Accord discussions.

Further, in Budget 2016, the Federal Government announced its intent to develop, in collaboration with provinces, territories, research institutions and others, a nationwide Canadian Cluster Mapping portal.⁶ The cluster map will show complementary linkages between companies and other actors, such as universities and colleges, research organizations and financing sources, in a specific industry sector and location. Research Hospitals can and should be key participants in the Cluster Map. Finally, we believe it would be important to allow Research Hospitals to compete directly and fairly for the innovation clusters funding for which the Government has set aside \$800 million per Budget 2016. We need to support a health and life sciences cluster.

Recommendation 1: Recognize Canada's Research Hospitals as an innovation sector within the business related innovation agenda by ensuring they are included in all federal innovation and infrastructure programs.

Recommendation 2: Consider a credentialed Research Hospital system that allows for the identification of Research Hospitals and the linkage of resources and accountability for innovation performance nationally.

Did you know...?

A Canadian Research Hospital unveiled the first mobile digital mammography vehicle, ensuring breast cancer screening in rural areas.

The Research Hospital sector has been identified as the most collaborative research sector in the economy?

A Canadian Research Hospital developed a genetic test to identify which men are at highest risk for prostate cancer.

2. Global Science Excellence: *How can colleges play a larger role in the innovation ecosystem? How can we increase demand for STEM graduates? How can we make best use of our science and research strengths?*

We appreciate the question on how colleges can play a greater role in the innovation agenda within the health and life sciences space. When colleges and universities train individuals as STEM related practitioners or researchers in the health and life sciences, they rely heavily on health settings as their training grounds and potentially as the place of employment that gives value to trainee's investment. For example, one of the country's most prominent colleges, The Michener Institute, recently merged with the University Health Network, one of the country's largest Research Hospitals. The goals are to enhance the training of hospital workers for the future and become globally competitive in innovative training programs. We therefore ask that in order to support universities, colleagues and businesses in the health and life sciences, Research Hospitals need to be recognized as full and eligible partners in all federal research, innovation and infrastructure programs.

In terms of making the best use of our science and research strengths, we cannot commercialize or capitalize what we don't discover.⁷ This requires patients and patient settings to bring capitalized or commercialized ideas safely to the country. A healthy research and innovation pipeline is essential if we are to have the source-pool from which to leverage the Canadian economic and innovation advantage.

Basic research is the source-pool from which other research and innovation flows. It can help to foster a culture of enquiry that attracts talented and motivated individuals. When co-located in patient care settings, access to novel findings attracts leading clinicians, a critical mass of top talent, access to further private and public funding, increased capacity for innovative treatment, and ultimately, better care.⁸ To leverage this we need an overarching plan for the health and life sciences or our system will remain haphazard, cobbled together and piecemeal.

Predictable growth and improved coordination across the various federal granting councils are essential in order to fully leverage our potential for commercialization. Commercializable products are the result of a healthy research and innovation ecosystem. Insufficient funding to the granting councils results in lost opportunities for promising researchers and research that is either not pursued at all or taken abroad. We need to ensure a healthy pipeline if we want research and innovation to benefit our health and the economy.⁹

Predictable growth in funding is also crucial to ensure that the full costs of the infrastructure needed to foster innovation and commercialization can be supported. Canada's coverage of indirect costs is much lower than in other countries and we encourage a more competitive approach. For example, in the US, the indirect costs program covers approximately 50% of total indirect costs, the UK covers close to 80% and Australia covers between 30 and 90%. This compares to an average of 20% of indirect costs that are covered in Canada.¹⁰

Did you know...?

A Canadian Research Hospital is the first in the world to treat a brain tumor non-invasively.

A Canadian Research Hospital is the first in North America to use ultrasound and MRI to destroy bone cancer.

A Canadian Research Hospital produced the world's first commercial imaging product available for PET/MRI scanners.

The absence of strategic coordination between programs funding researchers and those funding infrastructure have created gaps in the capacity to operate and maintain capital investments. It is also crucial to consider the balance between inter-disciplinary research and more targeted research when optimizing funding programs. Both are necessary to establish a productive innovation ecosystem.

Recommendation 3: Increase investments to research and innovation programs and councils, including the federal support to research fund, while improving governance, strategic and operational integration among them.

Recommendation 4: Recognize Research Hospitals as essential partners to the success of universities, colleges and businesses in the health and life sciences.

3. Entrepreneurial and Creative Society: How can Canada become the best country in the world for attracting /developing talent? How do we work together to equip youth with the right skills for the future economy? What more can be done to cement Canada's place as a leaders in social entrepreneurship?

Our healthcare system and hospital-based research is, at least to those in the sector, as much a part of Canada's heritage as hockey and maple syrup. As evidenced by the media's coverage of these innovations, hospital-based research makes for great stories, yet it would be very surprising to us if Canadians at large were aware of many of these developments. Our first recommendation in helping Canada to become the best country in the world for attracting and development talent is to celebrate our achievements. To this end, HealthCareCAN has recently made a submission to the Canada 150 Fund for a project called "RICH's (Research and Innovation in Canadian Hospitals) - Made in Canada".

Next we need to "walk the talk" of innovation. The last thing we want to do is encourage students to sign up for innovative university and college programs that do not lead students to fruitful opportunities in the job market. In 2008, John Evans wrote:

"...the substantial increase in research funding during the past decade has made Canadian research institutions outstanding places to carry out health research that attracts brilliant scientists and the development of internationally respected teams. Morale has been lifted and Canada is viewed as a great place to work. It would be tragic to undermine morale and lose momentum by uncertainty about the government's ongoing commitment to research. Talent is mobile and the market is hot".¹¹

How is morale today? It is certainly on the decline. The roles of individuals, both as the generators and funders of innovation and the role of healthcare organizations are crucial in the capacity to generate health technologies and bring them to market.

Clinicians and researchers who have viable commercial opportunities and who wish to do so must not be dis-incented by performance management and measurement

Did you know...?

A Canadian Research Hospital is using big data to anticipate where and when the next Zika outbreak is likely to occur.

A Canadian Research Hospital will become home to NATO's first research chair in military mental health.

A Canadian Research Hospital launched the world's first clinical trial of a double-virus cancer treatment.

approaches that favour publication over commercial endeavour. What can we do as a country to put incentives in place for these individuals?

We also believe that companies, who choose to structure their operations around the public healthcare system, should be rewarded with tax benefits and carefully considered procurement opportunities. Most importantly, we would encourage the Federal Government to consider Research Hospitals as fully eligible applicant partners in the innovation networks and clusters to which the Federal Government dedicated \$800 million in Budget 2016 as part of its impending Innovation Agenda.¹² To this end, we would also encourage a carve-out in the Venture Capital Action Plan to accommodate the untapped commercial potential of Canada’s health and life sciences ecosystem.

Recommendation 5: Reward companies who choose to structure operations around the public healthcare system with tax benefits and procurement opportunities.

Recommendation 6: Ensure Research Hospitals are fully eligible applicants and partners in federal funding for innovation networks and clusters including the Cluster Portal and Cluster Innovation Funding.

4. Ease of Doing Business: *How can regulations be designed to promote innovation across key sectors? What new approaches could be explored to improve government services to business?*

We commend Budget 2016’s proposal for coordinated R&D services from key organizations starting with Innovation, Science and Economic Development Canada, the Business Development Bank of Canada, Export Development Canada, the Industrial Research Assistance Program, Global Affairs Canada’s Trade Commissioner Service and the Regional Development Agencies. We believe this effort will assist not only business but those organizations heavily involved in the health and life sciences. This appears to us as an extension of the Jenkins’ Panel recommendation for a *whole of government* approach and we would suggest that in the health and life sciences there are additional partners to be considered (e.g. health charities). For this reason, we would also encourage a “whole of government approach” by establishing a national health and life sciences roundtable.

A national health and life sciences roundtable would help to ensure that the wide range of programs, agencies and stakeholders within the health research and innovation ecosystem work in unison. The roundtable would guide policy decisions, coordinate the range of programs, agencies and stakeholders involved in health research and innovation, and advise and hold accountable key federal departments on pathways to a sustainable health research ecosystem.

We begin this section with a focus on the approval of medical devices compared to other jurisdictions. This has been particularly difficult for technologies invented and prototyped in Canada. In part, the multiple approval processes across the different provinces undermines companies from first pursuing regulatory clearances in Canada. Not only is our market small, it is fragmented across provincial boundaries. Some

Did you know...?

A Canadian Research Hospital is the first to predict how patients will respond to psychiatric medications.

A Canadian Research Hospital discovered that mental stimulation may offset the impact of poor diet on cognition.

A Canadian Research Hospital discovered a new gene critical for vision.

experts suggest that Canada should be developing a standardized device regulation framework.

Similarly, in the area of clinical trials, differences in provincial ethical review processes, contract negotiations, and patient recruitment protocols may discourage pharmaceutical companies from choosing Canada as the ideal location to do their trials. To address this issue, an Action Plan *“To Your Health and Prosperity: An Action Plan to Help Attract More Clinical Trials to Canada”* was developed through a collaboration of the community, led by CIHR, HealthCareCAN, and Innovative Medicines Canada in 2011. A Canadian Clinical Trials Coordinating Centre has now been established to implement these recommendations.¹³

In terms of regulations related to the procurement of technologies, supplies and equipment that are required within healthcare organizations, organizations and provinces currently adopt a lowest cost policy even though an innovative made-in-Canada product may be available and benefit the overall economy. If healthcare organizations and different levels of government work together on the goal of procuring products that meet the needs of Canadians while supporting made-in-Canada products and firms, we become our own best customers. If the Federal Government were to assume a leadership role, some of our healthcare expenditures could potentially be offset if the dollars we spend are used to support Canadians, Canadian products and their spin-off companies.

This needs innovative policy consideration because the Federal Government would have to provide assistance to ensure the costs of healthcare delivery are not artificially inflated by purchasing a Canadian innovation, simply because it is Canadian. In addition to some procurement considerations, it is therefore the better solution to make our products more cost effective and better than those of global competitors by retaining our top talent, bringing in venture capital funds, and coordinating across the health system. By positioning our hospitals correctly in the innovation ecosystem (access to patients and patient samples, top talent, better funding, etc.), we may be able to improve our ability to attract companies to undertake the co-development of new products with revenue streams coming back to our hospitals.

In turn, Canadian products and companies have a better chance of entering global markets. Otherwise, foreign decision-makers may attribute the failure of companies to penetrate their domestic markets, as a flaw in their product, company or approach. Finally, the mere *potential* of entering the Canadian healthcare market may have the cyclical effect of attracting venture capitalists and facilitating greater collaboration with industry.

The Council of Canadian Academies’ 2009 report on innovation proposes that: “Given Canada’s single payer health care system, governments have the opportunity to support innovation that goes beyond the decision of whether to approve a new compound at Health Canada or the provincial formularies. Canadian Governments could seek to establish a leading role in using health innovation to improve the productivity and quality of the health care system”.¹⁴ We agree with this proposition

Did you know...?

A Canadian Research Hospital has launched a world first clinical trial for pediatric cancer patients facing a therapeutic dead end.

A Canadian Research Hospital discovered a new gene that predisposes people to both autism and epilepsy.

A Canadian Research Hospital will be home to cutting edge biomedical, genomics and population health research in 2018.

and believe that it is key to leveraging up the Canadian advantage in the health and life sciences sector. If we can increase our capacity to develop good ideas, we have an enormous potential to benefit Canada and the world, especially given Canada's leadership both in biotechnology and in the reputation of its health care system.

A program that was particularly well received across the Research Hospital community was the CIHR Proof of Principle Program. This program supported Canadian health researchers in moving discoveries from the academic setting towards commercialization. The program was lauded for its flexibility and the absence of back end royalty obligations to the agency providing this funding.

The Small Business Innovation Research (SBIR) Program in the United States is an example of a program that has helped launch many successful spin-off companies by supporting each phase of the process and enabling strategic procurement of spin off company products by the Federal Government. It may be a useful program for Canada to consider emulating. The program's goals are: (1) stimulate technological innovation; (2) meet federal research and development needs; (3) foster and encourage participation in innovation and entrepreneurship by socially and economically disadvantaged persons; and (4) increase private-sector commercialization of innovations derived from federal research and development funding. Its mission is to support scientific excellence and technological innovation through the investment of federal research funds in critical American priorities to build a strong national economy. It differs from existing Canadian programs because it is available all year, is phased and focused on each stage of the commercialization cycle, involves minimal red tape and paperwork, and, importantly, is tied to the expectation of the procurement of developed products by the US Federal Government.

Recommendation 7: Encourage strategic innovation procurement for carefully selected innovations in the health sector and position hospitals appropriately in the innovation ecosystem to retain talent and venture capital.

Recommendation 8: Explore the potential for a Small Business Innovation and Research type program in Canada and encourage a "whole of government approach" to research and innovation in the health and life sciences.

5. Grow Companies and Accelerate Clean Growth: *How can Canada support the scale up of innovative companies? What market based approaches encourage adoption of clean technologies? What more can be done to increase BERD spending?*

We have responded to most of the questions in this section that pertain to the scaling up of innovative companies in our response to question 4. We would add to this the importance of considering the findings of the Federal HealthCare Innovation Advisory Panel (July 2015) and the importance of establishing a dedicated Healthcare Innovation Fund for the health sector.

More specifically, we would like to focus our response to this question on clean technologies. When it comes to the environment, the hospital sector is a friendly giant with a dual dilemma. First, operating 24 hours a day, 7 days a week, it has

Did you know...?

A Canadian Research Hospital performed the first endoscopic procedure in North America using a biodegradable stent.

A Canadian Research Hospital developed a germ-killing robot to protect vulnerable patients.

Canadian Research Hospitals developed a "first-in-kind treatment guideline for opioid addiction and a tool to treat chronic heroin addiction.

significant chemical, waste, energy, water, transportation, food, pharmaceutical, physical plant, and purchasing requirements, each of which are documented to have significant impacts on the environment. It is estimated that Canadian hospitals account for 8% of public green-house gas emissions and 11% of total public energy consumption.

Addressing each of these elements is part of the “Comprehensive Environmental Health Agenda for Hospital and Health Systems around the World”, published by the Global Green and Healthy Hospitals consortium. We believe it is time for Canada to join the movement and include hospital considerations in its sustainable development, green infrastructure and climate change agenda.

Second, hospitals help us to preserve and restore our health in times of need. They must remain resilient in the face of climate change and disaster. This is an obvious goal. However, we have seen many instances of hospital evacuations in the face of flood or fire. We need to aim for a hospital system that remains fully operational and resilient in the face of disaster. These exist and interestingly, it has been shown that planning for climate resilience also leads to more sustainable practices. The hospital sector therefore provides an outstanding opportunity to link green and clean technologies with infrastructure, stimulus and public safety.

Fortunately, our hospitals are taking initiative across the country. In a survey of members’ physical plant infrastructure needs, our members have identified over 363 physical plant initiatives that are intended to repair, retrofit or rebuild facilities so that they are cleaner, greener, more efficient, sustainable and resilient. Unfortunately, they are doing this against a growing backlog of deferred maintenance due to fiscal pressures that have caused the deferral of major, much needed capital repairs and expenses. They are playing their role with the provinces, but require the support of the Federal Government in terms of leadership, funding support for greener construction choices, and representation.

- Recommendation 9:** Allow hospitals and health regions to apply and compete for federal green infrastructure funds.

Recommendation 10: Develop technological, knowledge or social infrastructure that allows for the tracking of healthcare related green infrastructure best practices, need, and eventually the scaling of selected initiatives.

6. Competing in a Digital World: *What do we need from our digital infrastructure? How fast can we transition? What are innovative ways to develop stronger digital skills among Canadians?*

When it comes to competing in a digital world, the Canadian healthcare sector is still far behind other developed countries. We commend the Government for Budget 2016’s investment of \$50 million over two years through Canada Health Infoway for e-prescribing and tele-homecare, however, more can be done. Knowledge and technology exceed our capacity for application and implementation.

Did you know...?

Did you know that Research Hospitals are among Canada’s top Innovation Performers and the only ones showing growth in 2015-2016?

Did you know that a Canadian Research Hospital wind turbine won a “new technology of the year award”?

Canadian Research Hospitals in Ontario generated \$190 million from industry contacts. (Source: CAHO Metrics, 2016)

Digitally our goal in healthcare should be to emulate locally, regionally, provincially and nationally what banks have been able to do globally. This might include a personal universal identifier for digital health. To this end, we support the Federal Healthcare Innovation Advisory Panel recommendation for a Healthcare Innovation Fund that could help bring the focus, expertise, incentives and resources required to achieve this vision. We would also encourage examination of the appropriate role of government in digital oversight to ensure innovation can flourish while ensuring interoperability.

We also believe that, in terms of digital technology, we can better utilize strategic funding at the Canada Foundation for Innovation (CFI). Currently, CFI will only fund novel technologies. However, regular technologies also facilitate a tremendous amount of innovation. We encourage CFI to reconsider its conceptualization of technology for innovation as this will help to better leverage and maintain existing infrastructure.

Recommendation 11: Allow CFI to use funding not only for innovative computational equipment but for modernizing regular digital infrastructure that permits the generation of innovation.

Recommendation 12: Explore the possibilities and infrastructure needed for the use of Big Data in healthcare

Conclusions

In conclusion, a Canadian advantage exists not only through universities, colleges and business, but also in our Research Hospitals and across in the health and life sciences. However, we must become aware of successes, strengths and challenges if we are to leverage and/or address them. By formally including Research Hospitals in the Innovation Agenda, and systematically tracking both success stories and challenges, we will identify national solutions to emerging issues. When we promote meaningful successes, we offer greater visibility and marketing opportunities to companies that can attract further investment and incent a culture in which innovation is the foundation for better health, increased economic output, and global impact.

¹ Miller, F.A., French, M., 2016. "Organizing the entrepreneurial hospital: Hybridizing the logics of healthcare and innovation". Research Policy.

² Department of Finance Canada, 2016. "Budget 2016: Growing the Middle Class". <http://www.budget.gc.ca/2016/docs/plan/budget2016-en.pdf>

³ Association of Canadian Academic Healthcare Organizations, 2008. "Three Missions... One Future: Optimizing the Performance of Canada's Academic Health Sciences Centres". <http://www.healthcarecan.ca/wp-content/uploads/2014/11/05.30-NTF-EN-FINAL.pdf>

⁴ Dr. Christopher Paige, January 18, 2010. "Why research matters". The Hill Times.

⁵ Ibid

⁶ Department of Finance Canada, 2016. "Budget 2016: Growing the Middle Class". <http://www.budget.gc.ca/2016/docs/plan/budget2016-en.pdf>

⁷ Association of Canadian Academic Healthcare Organizations, May 2013. "From Bench to Bedside to Business... The Commercialization Opportunity of Academic Healthcare Organizations: A Submission to the House of Commons Standing Committee on Health".

Did you know...?

A Canadian Research Hospital developed the first widely protective vaccine against chlamydia.

Canadian Research Hospital is the first to host a large-scale precision medicine research program to identify patients at greatest risk for stroke in the Emergency.

A Canadian Research Hospital developed the first widely protective vaccine against chlamydia.

<http://www.healthcarecan.ca/wp-content/uploads/2014/07/From-Bench-to-Bedside-to-Business.pdf>

⁸ Ibid

⁹ H10, 2016. "What is needed to sustain a healthy research ecosystem for Canadian health and life sciences?". <http://www.healthcarecan.ca/wp-content/uploads/2016/04/4-What-action-is-needed-for-health-research-and-innovation-in-Canada.pdf>

¹⁰ CAUBO, 2013. Indirect Costs of Research <https://www.caubo.ca/knowledge-centre/surveysreports/indirect-costs-research-report/>

¹¹ John R. Evans, 2008. "The infinite horizon of health research: Is Canada visible?"

¹² Department of Finance Canada, 2016. "Budget 2016: Growing the Middle Class". <http://www.budget.gc.ca/2016/docs/plan/budget2016-en.pdf>

¹³ Canadian Clinical Trials Coordinating Centre (CCTCC): <http://www.cctcc.ca/>

¹⁴ Council of Canadian Academies, 2009. "Innovation and Business Strategy: Why Canada Falls Short". pp. 191.