

Investing in Health Research to Enhance Canada's Productivity and Competitiveness:

Research Canada Submission to the House of Commons' Standing Committee on Finance (FINA)

Executive Summary

Research Canada appreciates the opportunity to make its submission to the House of Commons' Standing Committee on Finance's pre-budget consultations for the 2018 Federal Budget.

It is our view that investments in fundamental health research in the context of a strong national science enterprise, described in this year's Fundamental Science Review, led by Dr. C. David Naylor, are critical to ensuring the long-term productivity of Canadians and Canadian businesses. We cannot have a conversation about measures to support Canadian productivity and competitiveness without recognizing the central position played by investigator-led fundamental science within Canada's innovation engine, key to Canada's current and future economic success. As Dr. Naylor notes, "... basic research is the upstream source of the foundational building blocks for innovations of transformative importance to the world,"¹ yet, "Canada's research competitiveness has eroded in recent years when compared with international peers."² Organization for Economic Cooperation and Development (OECD) figures show Canada trailing the OECD average and losing ground when it comes to research intensity and growth.³

If we want to enhance our global competitiveness, investment in fundamental science – and health research in particular – is essential. Our young researchers require better support, to keep them here and leverage their talent for the Canadian innovation project. Our workforce needs Canadian research addressing their unique healthcare needs in order to keep them as engaged and productive as possible. And Canada's innovation pipeline requires enhanced public support of its primary fuel – fundamental science research – in order to attract and spur further investment and development by the private sector.

Our Recommendations

In the current knowledge economy, Canada's ability to innovate is a primary factor in our competitiveness and productivity; however, we are significantly outpaced internationally on several indicators. If Canada wants to change that story, we must immediately address our acute research funding deficit.

We call on the Federal Government to implement the Naylor Report's detailed plan for multi-year investments into the renewal of fundamental science in Canada. In particular:

1. Increased investment of \$485 million over four years to fund independent investigator-led research
2. Stable funding of \$300 million annually for the Canada Foundation for Innovation (CFI)
3. Enhanced support for doctoral students, postdoctoral fellows, and research chairs
4. New support for small capital grants, as well as for the costs associated with federally-funded research
5. Financial support to diversify opportunities for science-based graduate students so that they may explore, embrace and compete for non-academic careers in order to fully capitalize on their talent and energy.

While each of these recommendations is important, they ultimately hinge on the first. Without significant reinvestment in fundamental, investigator-led science, other related investments will be ineffectual.

About Research Canada

Research Canada is a national, broad-based alliance dedicated to advancing health research and health innovation through collaborative advocacy. Our mission is to improve the health and prosperity of all Canadians by championing Canada's global leadership in health research and innovation. Our key goals are to ensure that health research is a high priority of the Federal Government and to increase investments in health research from all sources.

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Introduction

Among industrialized countries, Canada's per capita investment in health research is the lowest in the world,⁴ while Canada's overall investment in research and development intensity and growth has been shrinking for more than a decade. With other nations ramping up their efforts, Canada is now not only trailing many other nations, as well as the OECD average (1.6 per cent vs. 2.4 per cent of GDP), but falling further behind.⁵ At the same time, Canada has been losing ground in basic research indicators, such as our share of published articles and total research output.⁶ Canada remains a respected player internationally in health research, but today's performance reflects the investments of a decade ago and shows serious signs of weakness. If current funding trends continue, our previous advantage will be relinquished, hurting Canada's long-term productivity and competitiveness.

What federal measures would help Canadians to be more productive?

It starts with investing in young people. Reinvestment in fundamental health science is critical to building a diverse, robust, knowledge-based workforce.

Higher education is a vital contributor to the innovation pipeline. As the Naylor Report states: "Immersion in research changes the way people think and solve problems, and doctoral graduates are particularly well-equipped to help improve our lagging productivity and innovation indices."⁷ Canada has reasonably high rates of engagement in higher education and it is an attractive country in which to study for foreign graduate students. We put that potential brain trust at risk, however, when we do not adequately fund the research programs that enrich the educational experience and attract those students in the first place. Increased support for investigator-led fundamental science, as described in the Naylor Report, would address this, as well as enhance stipendiary support for graduate students and post-doctoral fellows who are traditionally involved with this enterprise.

We know that Canada has fewer researchers per capita than peer countries such as Australia, the U.K. and France⁸ and that the vast majority of doctoral graduates do not head to full-time academic positions,⁹ in part due to lack of funding. There is the concern that this situation may lead some of our most promising minds to leave the country in order to pursue their desired research career. A well-funded science enterprise can address this, helping to capture the excitement of budding

researchers and show them the economic viability of a scientific career in Canada. But we also need support for training that allows young health researchers to transfer their skills to their professional destinations, including to non-academic settings, and be adaptive to future demands, such as the challenges and opportunities posed by robotics, artificial intelligence and increasingly automated processes.

It requires made-in-Canada health research to support the unique needs of the Canadian population and workforce.

A productive workforce is a healthy workforce and good health is essential to the ability of Canadians to participate in it. To support this, we cannot rely on health research from other jurisdictions; we need investment in made-in-Canada health research that speaks to the particular needs and challenges of Canada's diverse population. These include:

- Research addressing the unique healthcare needs of one of the world's most multicultural populations, with a complex array of genetic, lifestyle and behavioural risk factors.
- Research addressing innovative ways of delivering high-quality, public health care in remote and rural settings, including through the use of new technologies.
- Research addressing how to alleviate the disproportionate burden of disease and disability carried by our Indigenous peoples, e.g. higher rates of infant mortality, mental health disorders, diabetes, obesity, heart disease and HIV. Canada's Truth and Reconciliation Commission has called on the Federal Government, in consultation with Aboriginal peoples, to "establish measurable goals to identify and close the gaps in health outcomes between Aboriginal and non-Aboriginal communities."¹⁰ This can only be accomplished through local research that is sensitive to the values, traditions, knowledge and realities of Indigenous communities.
- Research that helps to explain and address Canada's high rates of specific disorders, such as multiple sclerosis – our rate leads the world, often striking Canadians in the prime of their working lives – which prevent Canadians from fully participating in the labour force.
- Research addressing the significant caregiver burden posed by an aging population, including its impact on labour force productivity. Canada is a leader in Alzheimer's disease research, among related dementias, identified as the second-leading cause of disability among people over age 70.¹¹

What federal measures would help Canadian businesses to be more productive and competitive?

We need public investment in science to fuel the discovery pipeline and drive private investment, leading to greater business productivity and competitiveness.

Nations with high rates of public research investment often also exhibit higher rates of private R&D intensity. Canada is outpaced in both research intensity and public spending on research by countries such as Australia (0.78 per cent GDP publicly spent on research vs. Canada's 0.72 per cent), Germany (0.82 per cent) and even the U.S. (0.85 per cent).¹² Germany's public expenditure is complemented by industry investment amounting to 1.9 per cent of GDP, compared to Canada's low 0.7 per cent.¹³ For the U.S., the latest figures show industry contributing 1.8 per cent of GDP towards R&D. A 2015 study commissioned by the British government found a clear relationship between public and private research investment, suggesting that every additional £1 of public funding led to between a £1.13 and £1.60 rise in private research investment.¹⁴

Private enterprise cannot innovate and flourish in a vacuum. Sustained and renewed public investment in fundamental science is crucial to priming the starting piece of the innovation pipeline. It mitigates inherent risk in the initial inquiry, fuels discovery, the generation of intellectual property, and, potentially, the interest of industry partners who can carry that discovery forward

into commercialization opportunities. The most successful innovation clusters in places such as San Francisco, Boston and Israel are those that integrate excellence in science with a spirit of entrepreneurship, industrial scale and local capacity to adopt the innovation. If the science is not fuelled, however, the cluster is weakened. The movement towards an “open science” model of scientific innovation, where publicly-funded research results are available to anyone, holds promise for smoothing out the choke points between knowledge creation, development and commercialization.

Conclusion

The timeframe for a return on the initial investment into fundamental science can be long, but the returns are real. The Naylor Report found that private rates of return on R&D average 30 per cent, and social rates of return from spillover effects have been typically two or three times larger, not including the effect that research-centered education has on shaping “the talents, skills, and ambitions of the next generation.”¹⁵

The impact of not investing in this work is equally real, yet it is often only felt years down the road, as perhaps we already are. Renewing Canada’s investment in fundamental health and science research is critical to the long-term productivity and competitiveness of Canadians and our nation. We will all reap the benefits, by nurturing and keeping our best and brightest research minds, supporting the health of Canadian workers and providing the vital supply of fundamental knowledge that feeds the pipeline leading to the innovations of tomorrow. We urge the Committee to recommend implementation of the Naylor Report’s prescription for multi-year investments into the renewal of fundamental science in Canada, preparing the ground for a prosperous future for all.

Notes

- 1 Advisory Panel for the Review of Federal Support for Fundamental Science. *Investing in Canada’s Future*. 2017. P. 21
- 2 Ibid. P. xi
- 3 Organisation for Economic Cooperation and Development. *OECD Science, Technology and Innovation Outlook 2016: Canada*. P. 1 http://dx.doi.org/10.1787/sti_in_outlook-2016-50-en
- 4 Moses. H. et al. 2015. The anatomy of medical research: US and international comparisons. *JAMA* 313 (2): 174-189. Shift Health analysis.
- 5 Organisation for Economic Cooperation and Development. *OECD Science, Technology and Innovation Outlook 2016: Canada*. P. 1 http://dx.doi.org/10.1787/sti_in_outlook-2016-50-en
- 6 Advisory Panel for the Review of Federal Support for Fundamental Science. *Investing in Canada’s Future*. 2017. P. 37
- 7 Advisory Panel for the Review of Federal Support for Fundamental Science. *Investing in Canada’s Future*. 2017. P. 44
- 8 Ibid. P. 45
- 9 Edge. J., Munro. D. *Inside and Outside the Academy: Valuing and Preparing PhDs for Careers*. Ottawa: The Conference Board of Canada; 2015. P. 8. <http://www.conferenceboard.ca/e-library/abstract.aspx?did=7564>
- 10 Truth and Reconciliation Commission of Canada. *Calls to Action*. 2015. P. 2-3.
- 11 OECD (2015). Addressing Dementia: The OECD Response, *OECD Health Policy Studies*, OECD Publishing. Paris. P. 22
- 12 Organisation for Economic Cooperation and Development. *OECD Science, Technology and Innovation Outlook 2016*. <http://www.oecd.org/sti/oecd-science-technology-and-innovation-outlook-25186167.htm>
- 13 Organisation for Economic Cooperation and Development. *Main Science and Technology Indicators*, Vol. 2016, Issue 2. 2016. Table 11. <http://dx.doi.org/10.1787/msti-v2016-2-5-en>
- 14 Economic Insight Ltd. What is the relationship between public and private investment in science, research and innovation? 2015. *Department for Business, Innovation and Skills*. P.5. <https://www.gov.uk/government/publications/research-and-development-relationship-between-public-and-private-investment>
- 15 Advisory Panel for the Review of Federal Support for Fundamental Science. *Investing in Canada’s Future*. 2017. P. 25

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