Investing in a Health Research and Innovation Ecosystem Strategy

Submission to the Standing Committee on Science and Research: Successes, Challenges and Opportunities for Science in Canada

RESEARCH CANADA | RECHERCHE CANADA
An Alliance for Health Discovery | Une alliance pour les découvertes en santé

OUR RECOMMENDATION

1. **That the Government of Canada develop a health research and innovation ecosystem strategy that includes:**
    a. Bolstered investment in fundamental science through the Tri-Council
    b. Support for diverse, highly-qualified research personnel, including the next generation, Indigenous Peoples and people from racialized and otherwise marginalized communities
    c. Support for health research and innovation ecosystem sectors that have faced significant challenges due to the COVID-19 pandemic:
        i. Academic health science centres
        ii. Health charities
        iii. Post-secondary institutions
        iv. Health and biosciences sector
    d. Support for an enabling environment for trans-sector partnerships through attention to and investment in culture, structures, incentives and governance
    e. Investment in the digitalization of our health system that facilitates and encourages public engagement in the discourse surrounding health, research and innovation

INTRODUCTION

On behalf of Research Canada: An Alliance for Health Discovery, we thank the Government of Canada for its leadership through the COVID-19 pandemic, including recent investments in key areas of health research and health innovation through Budget 2021. Such investments signal the Government's recognition of the fundamental importance of health research and innovation to our post-COVID recovery and our future health security, social wellbeing and economic prosperity.

Health and health care are high on the list of aspirations of people across the globe, and that has only become more apparent in this post-COVID world. Investments in health are essential to the economic growth of nations; investments in health have been demonstrated to yield higher rates of return than virtually any other investment that government can make. As a consequence, policymakers have a fundamental responsibility to protect and promote the health of the individuals and populations they serve.

A central and indispensable component of improving health is research. It provides us with the knowledge and tools to tackle health problems by enabling the development of new and improved ways of protecting and promoting health and of reducing disease. These advancements, however, are reliant on a fully-supported, future-ready **health research and innovation ecosystem** that is empowered—through investments and policies—to build upon our knowledge base through basic research and, in the face of ongoing and emerging health challenges, to collaborate and respond effectively with innovative applications of prior research.

The health research and innovation ecosystem is Canada's network of postsecondary institutions, research hospitals, governments, incubators, start-ups, innovative companies, investors, health charities and patient groups, each working in collaboration to advance science and develop innovative solutions to improve the health and wellbeing of all people living in Canada.

This is why we are calling for a whole-of-government strategy for the health research and innovation ecosystem, which will support the unique and essential roles contributed by each stakeholder. This strategy must be long-term, measurable, with concrete goals and targets, engage all ecosystem stakeholders in its development, including the public, and will expect and encourage trans-sector partnerships as a crucial mechanism for its success. Bold and transformative, versus incremental, change is required through the deliberate alignment of government priorities, policies, programs and investments across ministries to maximize the impact and potential of the health research and innovation ecosystem for all people living in Canada.

About Research Canada: Research Canada is a national alliance whose mission is to improve the health and prosperity of all Canadians by championing Canada's global leadership in health research and innovation.

DETAILED RECOMMENDATION

That the Government of Canada develop a health research and innovation ecosystem strategy that includes:

1.a Bolstered investment in fundamental science through the Tri-Council

Fundamental science is the non-negotiable starting point for any health research achievement, innovation, or commercialization. The scientific community's response to COVID-19 was built on decades of investment in fundamental research that had created a knowledge and technology base on which we could rapidly build. It enabled us to produce life-changing vaccines and treatments in record time and allowed individuals and economies to regain their footing. Fundamental science underpins the knowledge-based workforce and talent pool and sustains the bioeconomy, with material economic benefits; R&D investment by private industry, fed by basic science discovery, yields an average 30 percent return.[1]

Yet, notwithstanding Canada's more recent re-investment commitments, the longer-term trend sees Canada falling further behind its global peers, making the country less attractive to the world's research talent and harder to work in for early-career researchers trying to establish themselves. The Biden administration in the US recently proposed an investment of US $250 billion in science, research and innovation. Canada has yet to see a comparable commitment. We consistently trail our G7 partners in spending on R&D as a percentage of GDP.[2] The Federal Government must provide predictable, sustainable and robust project-oriented funding via the Tri-Council's Project Grant Programs to attract, retain and unleash the creativity of the researchers we need to generate the discoveries that fuel our innovation pipeline.

1.b Support for diverse, highly-qualified research personnel: the next generation, Indigenous peoples and people from racialized and other marginalized communities

Health research discoveries are supported through the research assistance of graduate students, trainees and postdoctoral fellows (PDFs)—our future R&D leaders and personnel. Many are still recovering from setbacks to their own projects due to pandemic-related lab shutdowns and funding uncertainties. Women, Indigenous people and members of other marginalized groups are disproportionately impacted. Without all these members of the research workforce, fundamental science activities informed by the full spectrum of realities and needs across Canada's diverse population cannot happen. Investments such as the last federal budget's announcement of $750 million to Mitacs are valuable supports for these young researchers, but do not replace direct awards. We urge the Federal Government to fulfill the 2017 Fundamental Science Review's investment recommendations for doctoral students, trainees and PDFs, building on its 2019 commitment to $114 million over five years for

[1] Advisory Panel for the Review of Federal Support for Fundamental Science. Investing in Canada's Future. 2017. P. 2
[2] OECD (2020), Gross domestic spending on R&D (indicator). doi: 10.1787/d8b068b4-en

graduate student awards. Guidance on how research institutions can effectively make the shift to greater equity, diversity, inclusion and accessibility would also be welcome.

1.c Support for ecosystem sectors that have faced significant challenges due to the pandemic

Academic health science centres **(AHSCs):** AHSCs host many fundamental science discoveries and are where their applications, such as vaccines and therapeutics, are clinically trialled. As AHSCs, Canada's leading research hospitals account for nearly $3 billion of the country's biomedical sciences research activity, employing more than 60,000 highly skilled researchers and staff.[3] The pandemic has destabilized these centres, with pre-existing research halted to create capacity for work on COVID-19. Much of this research is still struggling to resume, with impacts for individuals waiting for lifesaving and novel therapeutics, and a related financial loss due to the pullout of private industry partners. A coordinated, national approach to research funding and support for these institutions must be part of a health research and innovation ecosystem strategy, recognizing their vital yet precarious position as sites for discovery, skill development, partnership and innovation.

Health charities: Philanthropy and fundraising nearly disappeared during the pandemic as people across the country faced their own economic struggles. The existential threat for health charities, which are major sources of funding for health research, had a downstream negative impact on the AHSCs that conduct this work. As health research partners and leading representatives for the patient voice, the challenges that health charities continue to face in the recovery phase threaten to compromise the public legitimacy and relevance of our research ecosystem. A comprehensive health research and innovation ecosystem strategy must recognize health charities as an integral component of that continuum, with impacts on other stakeholders.

Post-secondary institutions: Universities and colleges inspire, educate and train the next generation of scientists and research assistants employed throughout the health research and innovation ecosystem. An ecosystem strategy will include support to this sector for: international student recruitment and retention; labour force access to upskilling and reskilling; research and knowledge mobilization; green, digital and accessible infrastructure; and innovative approaches to teaching and learning that reflect our pandemic recovery reality.

Health and biosciences sector*:* The biopharmaceutical, biotech and medical devices industries contribute to basic and applied biomedical research at universities and institutes; help AHSCs drive drug discovery and enhance clinical services to improve patient outcomes; boost the success of homegrown Canadian enterprises by fuelling the innovation pipeline; and are an important developer of Canadian life science research talent. More than 900 firms, employing more than 91,000 people, are translating and commercializing our basic science discoveries into

[3] HealthCare*CAN*. Independently-supplied information based on informal member survey. 2016.

solutions for Canada and the world.[4] A health research and innovation strategy for 21st century Canada must move beyond a view of these companies as simply vendors and producers to a model that treats them as true partners in health system development and sustainability. The work of the 2018 Health Biosciences Economic Strategy Table is a foundation on which the Federal Government can build. Our more recent **expert advisory report**, specific to the biopharmaceuticals industry, also offers important considerations for optimizing the entire sector's contribution to Canada's health research and innovation ecosystem.[5]

1.d Support for an enabling environment for trans-sector partnerships through attention to and investment in culture, structures, incentives and governance

Trans-sector partnerships have driven rapid vaccine development and scale-up during the pandemic, such as Moderna working with the National Institutes of Health in the US and AstraZeneca working with the University of Oxford. The Canadian COVID Genomics Network (CanCOGeN) is a consortium of public health authorities, academia, industry, hospitals, research institutes and large-scale genomic sequencing centres dedicated to better understanding the disease, informing decision-making and building Canada's capacity to address future pandemics.[6] It is one example of Canada's potential for productive trans-sector partnerships, yet longer-standing weaknesses in creating such partnerships, especially those involving industry, due to siloed thinking, have compromised the ecosystem's competitiveness and ability to deliver innovations to patients. The Federal Government must design a whole-of-government policy and investment environment where such partnerships are the expectation, not the exception, and that streamlines procurement and supports Canadian innovations coming to market. Basic science funding models must similarly support this collaborative reality.

1.e Investment in the digitalization of our health system

The pandemic has shown the pressing need for robust, secure, connected and interoperable health data that can accurately inform decision-making, enhance threat surveillance and help health leaders gain the upper hand in a crisis. The pandemic has also demonstrated the criticality of a public that is informed about and engaged with health research and the centrality of data to meeting that demand. And, we have witnessed data's power to drive science and innovation.

An effective health research and innovation ecosystem strategy will recognize the multiple opportunities inherent in digitalizing Canada's health system, including through digital tools designed with patient input.[7] Functionally, such reinvestments nourish the ecosystem's

[4]Canada's Economic Strategy Tables: Health and Biosciences. The Innovation and Competitiveness Imperative: Seizing Opportunities for Growth. 2018. PP. 3, 19.
[5]Report of Research Canada's Expert Advisory Panel. 2021.
[6]Ibid. P. 22
[7]Birnbaum, Faith et al. "Patient engagement and the design of digital health." *Academic emergency medicine: official journal of the Society for Academic Emergency Medicine* vol. 22,6 (2015): 754-6. doi:10.1111/acem.12692

interdependent nature by melding health knowledge with commercial application and by feeding back better information to researchers as they choose their next avenues of inquiry. In terms of economic potential, the digitalized health market was expected to reach $233 billion in value last year.[8] Data analytic processes could save Canadian healthcare at least $10 billion annually[9] and boost the system's productivity by an estimated $408 million through the adoption of virtual healthcare as a standard offering.[10]

CONCLUSION

The post-pandemic era represents a chance for Canada to chart a new path and invigorate a fresh spirit of partnership across the health research and innovation ecosystem. To do this, we must cultivate an ambitious, future-proofed policy and investment environment that supports our entire ecosystem and positions Canada for sustainability, growth and leadership. We urge the Government of Canada to adopt a whole-of-government strategy that supports each ecosystem stakeholder as integral to our overall success, preparing Canada to seize the opportunities and meet the as yet unknown challenges of tomorrow for the benefit of our collective health security, social wellbeing, and economic prosperity.

[8]Canada's Economic Strategy Tables: Health and Biosciences. The Innovation and Competitiveness Imperative: Seizing Opportunities for Growth. 2018. P. 19.
[9]Canada Health Infoway. Big Data Analytics in Health – White Paper. 2013. P. 25.
[10]Canada Health Infoway. Mobile Health Computing between Physicians and Patients –White Paper. 2014. P. 30.