



Written Submission to the Standing Committee
for Science and Research

Study on Federal Government Funding of Canada's
Post-Secondary Institutions

**Strengthening the Research Ecosystem through a
National Brain Research Initiative**

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The Canadian Brain Research Strategy and its broad network of stakeholders recommends the following:

Recommendation 1: That the Government of Canada unifies nationwide excellence in brain and mental health research with targeted investment towards the creation of a Canadian Brain Research Initiative.



EXECUTIVE SUMMARY

Brain health is a pressing global issue, and Canada stands at the forefront of addressing this challenge through its robust brain and mental health research ecosystem. Through a consensus-building process, the Canadian Brain Research Strategy (CBRS) has developed a unifying framework that aligns and coordinates research efforts across the country, as only a deeper understanding of the brain can lead to better prevention, maintenance, and optimization of brain health for the benefit of all Canadians and the world.

Canada's global excellence in brain and mental health research spans major research hubs and smaller institutions to form a rich and diverse research landscape. Our national research strategy aims to leverage Canada's unique and exceptional culture of collaboration to foster a coordinated, nationwide, transdisciplinary, and open brain science ecosystem. In making brain research more equitable, accessible, and democratic, we will enable broader contributions to our collective knowledge on the brain, thereby delivering greater impact from existing research investments.

Our strategy highlights the importance of long-term, stable, and flexible investment in talent and infrastructure. By developing highly qualified personnel (HQP), including technical and research personnel, and bolstering shared resources such as national research platforms, we can enhance research capabilities across all centers. This will not only advance discoveries in brain science but also build a highly skilled nationwide workforce to strengthen the entire innovation ecosystem, leading to significant health, social and economic benefits for the country.

The coalition convened by the CBRS believes that the time for a Canadian Brain Research Initiative is now. We have the nationwide network, partnerships, vision, and strategic plan in place. Now we need the funding to catalyze this ecosystem into concerted, bold, and concrete action.



CONTEXT AND CURRENT LANDSCAPE

Brain conditions — which include neurological disorder, brain injury, mental illness and/or addiction — are the leading cause of disability in Canada and worldwide. As of 2019, more than 7.5 million Canadians, or 1 in 5, reported living with a brain condition.¹ The prevalence of brain conditions is expected to rise with Canada’s quickly aging population² and has been exacerbated by the COVID-19 pandemic, which has seen 3-in-10 Canadians diagnosed with anxiety or depression since the onset.³ These factors will significantly drive up costs to the Canadian economy, which already amount to tens of billions of dollars per year, including in direct medical healthcare costs, social care expenses, income support, productivity losses, private insurance claims, and public disability payments^{1,4,5,6}.

There is no brain health without brain understanding. Canadian researchers are poised to make a significant leap toward understanding the brain — the most complex biological system in the known universe — by building on Canada’s rich history in pioneering brain research. In fact, Canadians specialize in neuroscience more than any other research area and more than other countries, and Canadian neuroscience and mental health research ranks in the top five in the world.⁷ Our brain researchers excel not just in major research hubs but also at smaller institutions across the country.⁸ The depth and breadth of brain science expertise is reflected in CBRS Leadership, which spans more than 40 brain and mental health research centres and programs nationwide.⁹ Together, they represent the full spectrum of research approaches essential for advancing brain science, including basic biomedical, clinical, health systems services, population health, social sciences, natural sciences, and Indigenous Knowledges.

Effective intervention requires a comprehensive approach to brain research and health that extends across the entire lifespan and recognizes the interconnectedness of brain disorders. Canada stands ready to spearhead a transformative shift in the scale and scope of collaborative brain research. Our national strategy for the future of brain and mental health research is rooted in the vision of early career researchers and built through consultations with scientists and broad stakeholder sectors across the country (Figure 1).^{10,11,12,13} This strategy advocates for the creation of a Canadian Brain Research Initiative to cultivate and coordinate a collaborative, transdisciplinary, and open brain science ecosystem, that will make brain research more equitable, accessible, and democratic, and thereby deliver greater impact. By implementing a national brain and mental health research strategy, Canada can strengthen its nationwide brain research ecosystem, amplify the impact of existing research investments, and leverage these advancements to prevent, maintain, and optimize brain health for the benefit of all Canadians and the world.

CHALLENGES AND SOLUTIONS

As noted by a recent federal advisory panel report, and corroborated by many witnesses for the Standing Committee on Science and Research's study on International Moonshot Programs, addressing ambitious research questions requires long-term, stable, and flexible research funding.^{14,15} Numerous nations — including the United States¹⁶, European Union¹⁷, Japan¹⁸, China¹⁹, and South Korea²⁰ — have invested hundreds of millions to billions of dollars in large-scale national and pan-national brain initiatives, offering targeted and sustained funding for research grants programs and supporting infrastructure (Table 1). This paradigm emphasizes national and global coordination and presents a crucial model for advancing our understanding of the human brain.²¹ Canada needs a brain research initiative of its own to be able to keep up with, connect to, and draw on these global efforts.

The complexity surrounding brain and neuroscience research requires coordination and close collaboration between all stakeholders as well as strong partnerships between the public and private sectors. Dedicated research funding for brain health must be a priority at intergovernmental, national and regional levels and should be both driven and supported by governments.

– World Health Organization²¹

Canada is already driving innovation and advancement in various fields by implementing targeted national research strategies that foster large-scale coordination and collaboration. Examples include the Pan-Canadian AI Strategy (\$566 million over two, 5-year phases; \$2 billion for computing capabilities and infrastructure in Budget 2024), National Quantum Strategy (\$360 million over 7 years), and the Biomanufacturing and Life Sciences Strategy (\$2.2 billion over 7 years) (Table 1). These initiatives aim to position Canada at the forefront of their respective fields not only by providing targeted research funding, but by enabling long-term and stable support to develop, attract, and retain top talent, and for critical research infrastructure.²²

Neuroscience and mental health researchers at all career stages, from institutions across the country have contributed to building our national strategy. This effort is further supported by Canada's largest professional association of neuroscientists, the Canadian Association for Neuroscience (CAN), and the Canadian Neurological Sciences Federation (CNSF), which represents clinician scientists across six neurological specialties (Figure 1).



Our national strategy emphasizes the importance of long-term, stable, flexible funding that is not tied to individual grants. This approach is essential to support critical ecosystem-building initiatives such as:

1. **A National Transdisciplinary Training Platform.** Linking institutions and sectors in the brain research ecosystem is essential to efficiently develop nationwide talent. Instead of creating comprehensive programs at each site, we aim to leverage and expand existing excellent programs across the country. By enhancing accessibility and building a coordinated network, we can ensure that highly qualified personnel (HQP) everywhere can be trained in collaborative, transdisciplinary, and open brain research that spans the innovation continuum. This will equip future brain scientists with the skills and knowledge needed to drive excellence and innovation in brain research and across all sectors of the Canadian economy and society.
2. **National Research Infrastructure.** To overcome geographic and institutional barriers, Canada's brain research ecosystem relies on its strong culture of collaboration and open science, which has led to the establishment of numerous shared research platforms across the country. Research platforms democratize access to cutting-edge technologies and also serve as unique transdisciplinary spaces for researchers and non-academic research partners to come together. To maximize the impact of these platforms, it is crucial to ensure effective collaboration and access across research centers to form a cohesive ecosystem.²³ This requires stable and predictable funding to support the infrastructure, particularly for the research staff involved in integrating and maintaining these platforms.²⁴

A unifying theme across our strategy is investing in people—developing HQP who drive innovation and technological progress, and who ultimately contribute to stronger economic growth for our country.¹⁴ Although much focus has been placed on graduate students, postdoctoral researchers, and scientists at the heads of labs, HQP also includes research technicians, research associates and other technical or research personnel. A national transdisciplinary training platform will benefit HQP by providing essential skills and training that supports the full range and trajectory of scientific careers. In a complementary fashion, robust research platforms offer HQP exposure to cutting-edge technologies and serve as employment hubs, fostering a highly skilled workforce that strengthens the entire innovation ecosystem.^{25,26}



OPPORTUNITIES AND FORECAST

We are verging on a new era in brain and mental health research, characterized by the rapid accumulation of data and the development of cutting-edge technologies like artificial intelligence (AI) that have the potential to revolutionize our understanding of the brain. Canada's unique and exceptional culture of collaboration and distributed research excellence positions us perfectly to excel in this new era but requires investment to enable robust collaboration and integration of resources. By building a coordinated, nationwide transdisciplinary, open science research ecosystem, we can harness these advancements to make significant strides in brain research and brain health.

Our vision for a Canadian Brain Research Initiative provides a unifying framework that aligns and coordinates research efforts across the country. By making long-term, stable investments in talent and infrastructure, we can amplify the impact of typically project-focused grants. Ensuring that data and resources are accessible to all researchers through open science infrastructure supports both mission-driven and exploratory research to enhance innovation and accelerate scientific discovery. This approach also de-risks research by allowing scientists to test their ideas with existing data before committing to costly pilot experiments. While particularly beneficial for smaller institutions with fewer resources, fostering a more equitable, accessible, and democratic research environment benefits everyone by enabling broader contributions to our collective knowledge on the brain.

Our ecosystem-building approach also offers a significant benefit by addressing the pressing issue of attracting and retaining top research talent in Canada. A recent survey of graduate students across Canada revealed that 64% were likely to leave the country after completing their degree, and 51% of recent graduates had either left or intended to leave. The primary factor driving this exodus is the pursuit of financial and job stability.²⁷ Furthermore, although Canada attracts skilled STEM immigrants, only about a third work in STEM fields, half the rate in the U.S.²⁸ By integrating these immigrants into the research ecosystem, we can fully utilize their talents and expertise. Creating long-term, stable research careers and technical positions will enable us to better develop, attract, and retain highly skilled technical workers within Canada. This will ensure that our research community continues to thrive, innovate, and contribute to global advancements in brain science. Moreover, Canada is experiencing a skilled labour shortage in health and biosciences²⁹ and these measures will create a critical mass of brain science talent for a spectrum of Canadian academic, industry, and other sectors to succeed.

CONCLUSION

Understanding the human brain is one of the greatest and most pressing scientific challenges of our time. The establishment of a Canadian Brain Research Initiative represents a pivotal opportunity for Canada to assert its leadership in the global brain health and research landscape. In order to tackle such a complex issue, we must be able to tap into the research expertise and excellence in brain and mental health research distributed across the country. By fostering a collaborative, transdisciplinary, and open science ecosystem, we can ensure that all researchers, regardless of their institution's size or geographical location, have the support and resources needed to contribute to groundbreaking discoveries. Long-term, stable, and flexible funding is essential for cohesive, transformative growth of the field. By investing in people and infrastructure to provide a coordinating framework for transdisciplinary and open collaboration, we can build a more dynamic and inclusive research ecosystem. This approach will drive innovation, enhance scientific discovery, and ultimately improve brain health outcomes for all Canadians and the world.

Country	Research Program	Timeline	Funding
United States	Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative Infrastructure: Distributed data repositories	2014-2026	more than \$5 billion USD
European Union	Human Brain Project Infrastructure: EBRAINS	2013-2023	\$880 million USD
Japan	Brain Mapping by Integrated Neurotechnologies for Disease Studies (Brain/MINDS) Program Infrastructure: Brain/MINDS Data Portal	2014-2024	\$365 million USD
China	China Brain Project	2016-2031	2021-2026: \$746 million USD
Korea	Korean Brain Initiative	2016-2026	Unknown

Canada	Pan-Canadian AI Strategy	2017-2022,	\$125 million CAD
		2022-2027	\$443 million CAD
	Infrastructure: Computing resources and capabilities	2024	\$2 billion CAD
Canada	Quantum Computing Strategy	2021-2028	\$360 million CAD
Canada	Biomanufacturing and Life Sciences Strategy	2022-2029	\$2.2 billion CAD

Table 1. National and pan-national research initiatives.

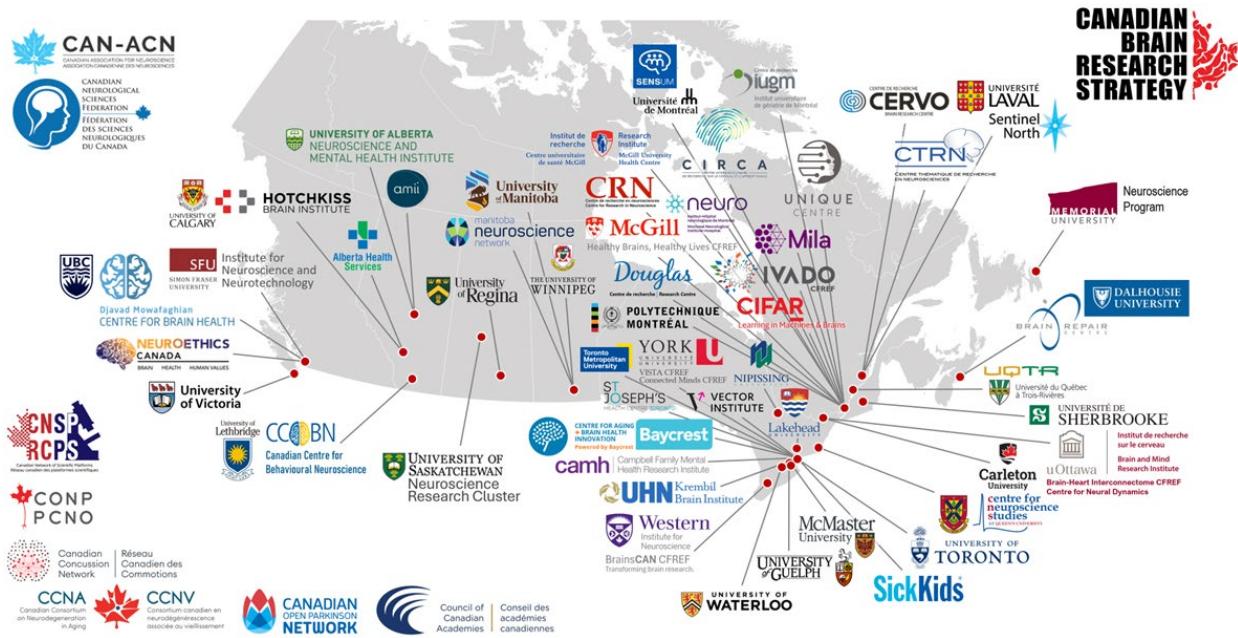


Figure 1. Geographic Distribution of Contributions: Brain and mental health researchers from diverse institutions and organizations across Canada provided input to our collective national strategy. This map highlights the breadth of consultation and underscores the potential for our strategy to impact research across various regions.

¹ Institute for Health Metrics and Evaluation (IHME) (2020) Global Burden of Disease Study 2019 (GBD 2019) Results. Available from <https://vizhub.healthdata.org/gbd-results/>

² Statistics Canada (2022) 2021 Census, The Daily Released: 2022-04-27 <https://www150.statcan.gc.ca/n1/daily-quotidien/220427/dq220427a-eng.htm>

³ Mental Health Research Canada (2022) Understanding the Mental Health of Canadians Throughout COVID-19 and Beyond: Poll #14 <https://www.mhrc.ca/findings-of-poll-14>

⁴ International Alliance of Mental Health Research Funders (2020) The Inequities of Mental Health Research Funding.

[https://digitalscience.figshare.com/articles/report/The Inequities of Mental Health Research IAMHRF /13055897](https://digitalscience.figshare.com/articles/report/The_Inequities_of_Mental_Health_Research_IAMHRF_/13055897)

⁵ Mental Health Commission of Canada (2011) The Life and Economic Impact of Major Mental Illnesses in Canada https://www.mentalhealthcommission.ca/wp-content/uploads/drupal/MHCC_Report_Base_Case_FINAL_ENG_0_0.pdf

⁶ Canadian Substance Use Costs and Harms (2020) Canadian Substance Use Costs and Harms Report (2015–2017) <https://csuch.ca/resources/national/>

⁷ Vincent Larivière et al (2016) Bibliometric Analysis of INMHA-related Research, 2000–2015. Prepared for the CIHR Institute of Neurosciences, Mental Health and Addiction.

⁸ For specific examples and features on individual researchers, see <https://canadabrainpower.com/>

⁹ Accessed on 24 May 2024 at <https://canadianbrain.ca/leadership/>

¹⁰ Neurological Health Charities Canada (2021) A National Neurological Strategy for Canada <https://mybrainmatters.ca/wp-content/uploads/NationalNeurologicalStrategyEN-Aug2021.pdf>

¹¹ Judy Illes et al (2019) A Neuroethics Backbone for the Evolving Canadian Brain Research Strategy. *Neuron*. doi:[10.1016/j.neuron.2018.12.021](https://doi.org/10.1016/j.neuron.2018.12.021)

¹² Caroline Ménard et al (2021) The Canadian Brain Research Strategy: A Focus on Early Career Researchers. *Can J Neurol Sci*. doi:[10.1017/cjn.2021.81](https://doi.org/10.1017/cjn.2021.81)

¹³ Melissa Perreault et al (2021) An Indigenous Lens on Priorities for the Canadian Brain Research Strategy. *Can J Neurol Sci*. doi:[10.1017/cjn.2021.501](https://doi.org/10.1017/cjn.2021.501)

¹⁴ Frédéric Bouchard et al (2023) Report of the Advisory Panel on the Federal Research Support System. <https://ised-isde.canada.ca/site/panel-federal-research-support/en/report-advisory-panel-federal-research-support-system>

¹⁵ Standing Committee on Science and Research (2023) Pursuing a Canadian Moonshot Program. <https://www.ourcommons.ca/DocumentViewer/en/44-1/SRSR/report-4/>

¹⁶ John Ngai (2022) BRAIN 2.0: Transforming neuroscience. *Cell*. doi: [10.1016/j.cell.2021.11.037](https://doi.org/10.1016/j.cell.2021.11.037)

¹⁷ Accessed on 1 February 2023 at <https://www.humanbrainproject.eu/en/about-hbp/human-brain-project-ebrains/>

¹⁸ Hideyuki Okano et al (2016) Brain/MINDS : A Japanese National Brain Project for Marmoset Neuroscience. *Neuron*. doi: [10.1016/j.neuron.2016.10.018](https://doi.org/10.1016/j.neuron.2016.10.018)

¹⁹ Science Insider (2022) China bets big on brain research with massive cash infusion and openness to monkey studies <https://www.science.org/content/article/china-bets-big-brain-research-massive-cash-infusion-and-openness-monkey-studies>

²⁰ Sung-Jin Jeong et al. (2016) Korea Brain Initiative: Integration and Control of Brain Functions. *Neuron*. doi: [10.1016/j.neuron.2016.10.055](https://doi.org/10.1016/j.neuron.2016.10.055)

²¹ World Health Organization (2022) Optimizing brain health across the life course: WHO position paper <https://www.who.int/publications/i/item/9789240054561>

²² Canadian Institute for Advanced Research (2020) Pan-Canadian AI Strategy Impact Assessment Report. <https://cifar.ca/wp-content/uploads/2020/11/Pan-Canadian-AI-Strategy-Impact-Assessment-Report.pdf>

²³ Claire Brown (2022) Canada needs to democratize access to state-of-the-art technologies and expertise. *Canadian Science Policy Centre Conference Editorials*, 01 Nov. <https://sciencepolicy.ca/posts/canada-needs-to-democratize-access-to-state-of-the-art-technologies-and-expertise/>

²⁴ Claire Brown et al (2024) Recognizing the importance of platform scientists. *University Affairs*, 29 Apr. <https://universityaffairs.ca/opinion/in-my-opinion/recognizing-the-importance-of-platform-scientists/>

²⁵ Laurence Lejeune et al (2020) Impact of Scientific Platforms on Research Success in the Canadian Natural Sciences and Engineering Ecosystem. <https://cnsp-rcps.ca/wp-content/uploads/2021/05/NSERCShortReport200604.pdf>

²⁶ The Canada Foundation for Innovation (2018) The Canada Foundation for Innovation's Major Science Initiatives Fund: A report on the advancement of research facilities funded between 2012 and 2017. <https://www.innovation.ca/news/report-highlights-impact-program-fund-canadas-nationally-significant-research-facilities>

²⁷ Ottawa Science Policy Network (2024) Brain Drain Survey Report.

²⁸ Joel Blit et al (2019) Can skilled immigration raise innovation? Evidence from Canadian Cities. Journal of Economic Geography. doi: [10.1093/jeg/lbz029](https://doi.org/10.1093/jeg/lbz029)

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