



Written Submission for the Pre-Budget Consultations in  
Advance of the 2023 Federal Budget

# **Brain Research Must Be a National Priority for the Social, Health, and Economic Advancement of Canada**

By: Canadian Brain Research Strategy  
<https://canadianbrain.ca/>



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

**Recommendation 1:** That the Government of Canada make research on the brain and mental health a national priority by establishing a Canadian Brain Research Initiative.

## EXECUTIVE SUMMARY

- Our brains define who we are, how we behave, what we strive for, and how we interact with each other and our environments. Because our brains are so integral to our capacities to live good lives, brain research has the promise to improve the lives of all Canadians.
- The annual healthcare costs of brain conditions in Canada are more than \$61 billion and growing<sup>1</sup>. Understanding the brain - in health, development, disease, and resilience - will be critical to Canada's success and well-being in the 21st century.
- Canada is a world leader in many fields of neuroscience and mental health research<sup>2</sup>, and is well-positioned to lead a paradigm shift in the scale and scope of collaborative brain research so that we can tackle novel, groundbreaking questions in this immensely complex system.
- We are at a critical inflection point in making progress to understand the human brain. Canada must seize this opportunity to reap the societal and economic benefits and needs to be able to keep up with, connect to, and draw on the efforts of other national and pan-national brain initiatives.
- The Canadian Brain Research Strategy (CBRS) has united Canada's neuroscience and mental health researchers, in coalition with Indigenous Knowledges Holders, people with lived experience of brain disease or injury, private and public science funders, and industry. Together, we have developed a clear and compelling vision for brain science to drive policy as well as social, health, and economic advancement for Canada and the world.<sup>3,4,5,6</sup>
- **The coalition convened by the CBRS believes that the time for a Canadian Brain Research Initiative is now. We have the network, partnerships, vision, and strategic plan in place. Now we need the funding to catalyze this network into concerted, bold, and concrete action.**

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<sup>1</sup> 2016 Report of INMHA Evaluation Panel from the CIHR Institute of Neurosciences, Mental Health and Addiction <https://cihr-irsc.gc.ca/e/50448.html>

<sup>2</sup> Larivière et al (2016) Bibliometric Analysis of INMHA-related Research, 2000-2015. Prepared for the CIHR Institute of Neurosciences, Mental Health and Addiction.

<sup>3</sup> Neurological Health Charities Canada (2021) A National Neurological Strategy for Canada <https://mybrainmatters.ca/wp-content/uploads/NationalNeurologicalStrategyEN-Aug2021.pdf>

<sup>4</sup> 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)

<sup>5</sup> Menard 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)

<sup>6</sup> 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)

## WHY IS A CANADIAN BRAIN RESEARCH INITIATIVE CRITICAL FOR BRAIN SCIENCE?

Our brains define who we are, how we behave, what we strive for, and how we interact with each other and our environments. **In 2016, science academies from 14 nations, including Canada, declared that the human brain is civilization’s most precious resource. Investment in brain science, therefore, is an investment in the future of society,** and nations must cooperate to understand, protect, and foster optimal development of the brain<sup>7</sup>. The brain is the most complex biological system in the known universe. Understanding the brain and how it gives rise to such a range of human health and life necessitates large-scale collective efforts that span countries and political boundaries.

National and pan-national efforts have formed around the world. The US BRAIN Initiative was established in 2014 and has expended approximately \$2.4 billion USD to date with a total of over \$5 billion USD expected through 2026<sup>8</sup>. The European Union launched the Human Brain Project in 2013 for a duration of 10 years with current total funding at €607 million<sup>9</sup>. Japan created their national Brain/MINDS program in 2014 with a more focused mandate, allocating ¥40 billion (approximately \$417 million CAD at the time) over 10 years<sup>10</sup>. At current, South Korea, China, and Australia are each developing their own national brain initiatives. Canada has much to contribute to humanity’s understanding of the brain, and we need to join in.

**Canada needs to establish a Canadian Brain Research Initiative as part of a stand-alone neurological health policy that reflects the diverse realities of our country.** National-level resource commitments are needed to strategically amplify Canada’s current investments and achievement in brain research. Similar efforts were launched in artificial intelligence (AI) when our Government had the foresight to create the world’s first national AI strategy in 2017. With an initial \$125 million investment and subsequent \$341.6 million in Budget 2021, the Pan-Canadian AI Strategy has seen AI centres across Canada evolve into a coordinated and flourishing ecosystem. Another recent approach, announced in Budget 2021, is the allocation of \$360 million to launch a National Quantum Strategy to grow the quantum ecosystem and establish Canada as a global leader. A Canadian Brain Research Initiative fits well into the brain science and larger research ecosystem centred around large-scale collaboration to tackle complex problems that already exists within Canada.

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<sup>7</sup> G Science Academies (2016) Understanding, Protecting, and Developing Global Brain Resources <https://canadianbrain.ca/announcement/2016-g-science-academies-statement-on-brain-research/>

<sup>8</sup> 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)

<sup>9</sup> Accessed on 8 October 2022 at <https://www.humanbrainproject.eu/en/about-hbp/human-brain-project-ebrains/>

<sup>10</sup> 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)

## **WHY IS A CANADIAN BRAIN RESEARCH INITIATIVE SO IMPORTANT NOW TO TRANSFORM THE LIVES OF CANADIANS?**

**A paradigm shift is urgently needed to transform the neurological and mental health of Canadians.** Because our brains are so integral to our capacities to live good lives, brain research has the promise to improve the lives of all Canadians. The annual healthcare costs of neurological health disorders in Canada are upwards of \$61 billion and growing<sup>1</sup>. Over 600,000 people are currently living with dementia in Canada<sup>11</sup>. As of 2019, 1 in 5 Canadians reported experiencing a mental health disorder<sup>12</sup>. Persistent challenges in neurological disorders and the mental health crisis have only been exacerbated by COVID-19. The prevalence of neurological and mental health disorders is also expected to rise with Canada's quickly aging population - between 2016 to 2021, the percentage of Canadians over the age of 65 rose from 16.9% to 19.0%<sup>13</sup>. It is more critical than ever to build infrastructures that enhance research collaboration and efficiency and to connect research to pressing societal needs.

Fortunately, **we are at just the right time for targeted, strategic investment in brain science to propel the productivity and innovation of Canadian brain researchers to next-level impact.** Data on the brain is accumulating at a rate like never before as technological advances have enabled an unprecedented variety and quantity of information - from biological, environmental, behavioural, and social perspectives. An investment in national-level resources accelerates brain research by enhancing: (1) efficient exchange and harmonization of diverse knowledge across sectors; (2) equitable access to cutting-edge research tools and expertise; (3) transdisciplinary collaboration and training of our young scientists; (4) development of novel technologies with broad application beyond brain research. Now is the time to leverage this critical mass of information to open new vistas of exploration.

Beyond improving health outcomes and associated economic burdens, **a coordinated national effort towards brain science will fuel innovations that can be applied to understanding other complex systems, expand the boundaries of technology, and drive the development of new tools to benefit science and society.** It was by building on our understanding of the brain that Canadians pioneered the research and development of artificial neural networks. This became one of the corner stones of artificial intelligence. As we emerge from the COVID-19 crisis, our Government has prioritized putting Canada's economy on a stronger footing, both for

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<sup>11</sup> Alzheimer Society Canada (2022) Navigating the Path Forward for Dementia in Canada <https://alzheimer.ca/en/research/reports-dementia/landmark-study-report-1-path-forward>

<sup>12</sup> 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/>

<sup>13</sup> Statistics Canada (2022) 2021 Census, The Daily Released: 2022-04-27 <https://www150.statcan.gc.ca/n1/daily-quotidien/220427/dq220427a-eng.htm>



Canadians today and future generations. In order to reap the societal and economic benefits from technology and intellectual property that arises from the cutting-edge brain research carried out across the country, Canada needs to establish our own national brain research initiative.

## HOW IS A CANADIAN BRAIN RESEARCH INITIATIVE AN OPPORTUNITY FOR CANADA TO LEAD?

In a recent national public opinion poll, 87% of Canadians believe Canada should be a global leader in health and medical research<sup>14</sup>. Indeed, **Canada has a rich history in pioneering brain science and Canadian neuroscience and mental health research ranks in the top five in the world<sup>2</sup>**. This is even more remarkable given that Canada is the only country in the G7 whose investments in Research and Development have steadily declined over the last 20 years<sup>15</sup>. We have been at the forefront of brain research for decades thanks to our distinctively Canadian collaborative, transdisciplinary, and open approach. We need to protect Canada's competitive advantage with a national brain research initiative to ensure that we will continue to be a leading contributor to global efforts.

Talented and skilled individuals have a critical role to play in a country's future prosperity. They hold jobs that are key for innovation and technological progress and ultimately contribute to stronger economic growth. **Canadians already specialize in neuroscience more than any other research area and more than other countries<sup>2</sup>**. National-level resources for brain research will position Canada internationally to better develop, attract, and retain Highly Qualified Personnel in academia, industry, and other sectors. Given the transformational potential of new tools and practices in brain science, it is especially critical that Canada invests in a Canadian Brain Research Initiative that will amplify the strengths and efforts of the next generation of young scientists.

**Canada can be a role model for how brain research is done.** In an approach unique among other brain initiatives, CBRS has brought together a pan-Canadian coalition including scientists, public and private funders, health charities, industry, as well as Indigenous Knowledge Holders and patient representatives to collectively envision a nation-wide brain research strategy. The coalition has collectively identified six near-term priorities to strategically scale up successful models of open, collaborative, transdisciplinary and ethical research. A Canadian Brain Research Initiative will guide brain researchers worldwide to reimagine research excellence, embed

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<sup>14</sup> Research Canada (2022). CanadaSpeaks! 2022 National Public Opinion Poll on Health and Medical Research.

<sup>15</sup> Organisation for Economic Co-operation and Development (OECD) Gross domestic spending on R&D 2000-2020. Accessed on 8 October 2022, Chart permanent URL: <https://data.oecd.org/chart/6PLi>



diversity and societal considerations in the research process, and shift research culture and practice towards collective excellence.

## **ABOUT THE VISION FOR A CANADIAN BRAIN RESEARCH INITIATIVE**

The collective national vision for brain science and societal impact represents a deep, informed perspective on the Canadian brain research landscape.

CBRS leadership<sup>16</sup> is comprised of the Directors of more than 30 neuroscience and mental health institutes and programs across the country, along with representatives of early career researchers, Indigenous Knowledges Holders, and people with lived experience of mental health disorders, brain disease and injury.

The CBRS is not seeking to become a parallel funding stream, but to be an objective third party that can convene, facilitate, and **activate** a collaborative and unified neuroscience and mental health research ecosystem. Our funder's coalition brings together more than 20 organizations supporting brain research, including federal and provincial research granting agencies, non-profit organizations, health charities, and private foundations. We have consulted with and continue to deepen our relationship with industry and entrepreneurs who are pushing the bounds of translating new knowledge in brain science.

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

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<sup>16</sup> Canadian Brain Research Strategy Leadership <https://canadianbrain.ca/about/>