Written submission for the Pre-Budget Consultations in Advance of the Upcoming Federal Budget

By: **P**an-**C**anadian **A**lliance for Artificial Intelligence Based Diagnostic and Treatment for **A**lzheimer's **D**isease

List of recommendations

- **Recommendation 1**: That the government include in any economic stimulus package for COVID-19, funding to promote domestic research and development, and production of pharmaceuticals, Active Pharmaceutical Ingredients (APIs), vaccines and Personal Protective Equipment (PPE).

- **Recommendation 2**: That the government foster a national translational research ecosystem for Alzheimer's Disease (AD) and other forms of dementia, building on existing national and provincial expertise and infrastructure.

- **Recommendation 3**: That the government provide funding in the amount of $15 million to strengthen its national translational research ecosystem for AD through the **P**an-**C**anadian **A**lliance for Artificial Intelligence Based Diagnostic and Treatment for **A**lzheimer's **D**isease (PCAAD).

Body of Submission

Currently, over half a million Canadians live with dementia, with 25,000 new cases diagnosed every year.[1] By 2031, this number is expected to increase by 66%, reaching 937,000.[2] Dementia has a profound emotional, social, psychological and financial impact on the individual, their family and society. In Canada, the combined healthcare system and out-of-pocket caregiver costs of dementia is estimated at $10.4 billion per year.[3] By 2031, this number is expected to increase by 60%, reaching $16.6 billion.[4] As identified in Chapter 3 of *A Dementia Strategy for Canada: Together We Aspire* (2019), the development of innovative approaches to therapies across all stages of dementia, from pre-symptomatic to early and advanced disease stages, are needed.[5]

The ongoing COVID-19 pandemic has emphasized how Canada's seniors have suffered, particularly in long-term care homes (LTCHs) where residents are the most vulnerable. In fact, nearly 70% of current residents in LTCH have some form of dementia,[6] and over 80% of all Canadian COVID-19 deaths were in LTCHs.[7] Among other factors, Alzheimer's Disease (AD) genetic pre-disposition has doubled the risk of death. The availability of appropriate molecular diagnostic and disease-modifying therapy for AD would have prevented this tragic loss of life, particularly in LTCHs.

In light of these figures, it is a moral imperative to expedite AD therapeutic developments for Canadians in a timely manner. Moreover, growing provincial waiting lists for long-stay beds - which stood at 34,834 in 2019 in Ontario[8] - combined with impending reduction of long-term housing density as a pandemic mitigation measure, will further exacerbate budgetary demands for LTCHs. As such, there is a clear social and financial benefit of investing in a disease-modifying AD therapy for the elderly population in order to postpone substantial cognitive and behavioural decline and delay entry into Canadian LTCHs. Discussions with provincial ministries indicate that delaying symptom onset / LTCHs entry by two years could save the provinces an estimated $65,000 per patient per year. The province of Ontario alone could save $2 billion of projected annual LTCH costs.

The **P**an-**C**anadian **A**lliance for Artificial Intelligence (AI) Based Diagnostic and Treatment for **A**lzheimer's **D**isease (PCAAD) is a not-for-profit organization, incorporated in Canada, working as a public-private partnership to accelerate the development of innovative products, including diagnostics and treatments, for Canadians living with AD. As a Canadian-based, neuroscientific alliance, PCAAD represents a collaboration between small and medium enterprises (SMEs), large companies, universities, hospitals and research foundations / clinical networks working in the area of biotechnology. PCAAD's leadership and membership consist

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1 Alzheimer Society Canada. 2018. Dementia numbers in Canada; available at: https://alzheimer.ca/en/Home/About-dementia/What-is-dementia/Dementia-numbers.
2 Ibid
3 Ibid
4 Ibid
5 For more information, see *A Dementia Strategy for Canada: Together We Aspire*. 2019. Area of focus 3.3: Develop innovative and effective therapeutic approaches; available at: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/dementia-strategy.html#s5.2
6 Canadian Institute for Health Information. 2018. *Dementia in Canada*; available at: https://www.cihi.ca/en/dementia-in-canada/dementia-across-the-health-system/dementia-in-long-term-care
7 Canadian Institute for Health Information. 2020. Pandemic Experience in the Long-Term Care Sector. How does Canada compare with other countries?; available at: https://www.cihi.ca/sites/default/files/document/covid-19-rapid-response-long-term-care-snapshot-en.pdf?emktg_lang=en&emktg_order=1
8 Ontario Ministry of Health and Long-Term Care. February 2019. *Long-Term Care Utilization Report*; Ontario Long Term Care Association, internal database, 2019. For more information, see : https://www.oltca.com/oltca/OLTCA/Public/LongTermCare/FactsFigures.aspx

of world-class Canadian experts including, veteran biotechnology executives, scientists, clinicians, and healthcare administrators, truly representative of the Canadian fabric.

Understanding the current government's endeavor to embed truly inclusive policy in the private-public ecosystem, PCAAD's inclusion framework focuses on promoting minority and female representation in STEM (Science, Technology, Engineering and Mathematics) leadership, creating scholarships for Indigenous and minority groups, and working with the National Collaborating Centre for Indigenous Health to address the growing issue of AD in Indigenous populations and develop culturally-appropriate diagnostic tools and medicine frameworks for Indigenous communities. PCAAD also strives for a balanced gender representation on its Board of Directors.

Grounded in its members' ongoing technological developments, PCAAD is uniquely placed to function as an integrative platform to foster the development and clinical testing of diagnostic and treatment technologies for AD. These innovative advances include disease-modifying treatments and remote access to diagnosis using voice and ocular analysis as well as AI. These technologies have the potential to improve access to diagnosis and care, reduce delays in diagnosis and decrease healthcare costs associated with dementia. As such, PCAAD represents a unique opportunity to harness Canada's broad and rich foundation of research in AD through strategic public-private partnerships to focus efforts on advancing AD diagnosis and therapies.

More specifically, PCAAD aims to strengthen Canada's translational research ecosystem for AD, building on the vast knowledge and experience that already exists at national and provincial levels. Through its clinical centers and members, PCAAD will help strengthen Canada's healthcare system to maximize access to disease-modifying treatments. This includes ensuring appropriate coverage and reimbursement of AD diagnostics and treatments, engaging and training primary care physicians and medical specialists, improving referral pathways and care coordination, and assuring appropriate availability and use of technology. Together, these activities will enable the public and private sector to work towards achieving common goals while sharing risk and expertise, and leveraging research investments for greater impact. For example, $15 million support from the Government of Canada to PCAAD, will allow to leverage up to $150 million towards the development of Canadian-made diagnostics and therapy for AD. This investment, in turn, will translate into billions of dollars saved by the Canadian healthcare system.

Government investment in the creation of a national research and innovation ecosystem for AD through PCAAD directly aligns with Canada's dementia strategy "Area of focus 3.2: Increase dementia research".[9] Most importantly, however, PCAAD will support the Canadian economy to recover from the COVID-19 pandemic in multiple ways.

- First, it will allow Canada to attract foreign investment – both in terms of highly-skilled human capital and direct foreign investment – with knock-on effects across the AI and biotechnology sectors.

- Second, it will help train and retain the next generation of high-skilled talent across healthcare and technology industries. Furthermore, it will contribute to building a world-class infrastructure around pre-existing Canadian academic centers for AD in

[9] For more information, see *A Dementia Strategy for Canada: Together We Aspire*. 2019. Area of focus 3.2: Increase dementia research; available at: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/dementia-strategy.html#s5.2

Montreal and Toronto, expanded across all provinces. This, in turn, will contribute to modernizing Canada's healthcare system as a whole, moving towards a more efficient digital healthcare infrastructure that is more resilient to the ongoing, and future, pandemics.

- Third, the COVID-19 pandemic has obviated the need to ensure a domestic supply chain for healthcare diagnostics and therapeutics that is more resilient to external shocks. This will ensure that Canadians have continued, timely access to affordable AD diagnosis and disease-modifying treatment.

- Fourth, government support to develop Canadian diagnostic and therapeutic technologies for AD will help foster an entrepreneurial landscape and retain Canadian companies on Canadian soil. This will increase Canada's Gross Domestic Product (GDP) by billions of dollars resulting from global product sales, foreign capital investment and curtailed brain-drain.

- Fifth, improved access to AD diagnosis and treatment will help Canadians stay healthier for longer in their communities. This will not only reduce healthcare utilization costs but will also improve Canadians' quality of life through continued contribution to the society and the economy in meaningful ways, including for people living with AD and their caregivers. This is particularly important given the productivity loss associated with unpaid care provided by family caregivers.[10]

- Together, these activities will contribute to enhancing Canada's GDP by commercializing its home-grown AD diagnostic and therapeutic products to the global market, placing Canada as a leader in the area of dementia, AI and biotechnology globally.

Through its members, PCAAD has the expertise, skills and knowledge to create a vibrant research and innovation ecosystem for AD, and beyond, that will set Canada on a path to economic recovery in light of the COVID-19 pandemic. A full list of PCAAD leaders and organizational partners can be found in the Annex.

On behalf of its members, PCAAD would like to thank the House of Commons Standing Committee on Finance for considering this written submission. Drs. Serge Gauthier (Global Center for AD at McGill Center for Ageing), Marion Masellis, (Sunnybrook Research Center and University of Toronto), John Gillard (KalGene), Danica Stanimirovic (National Research Council) and Nathan Yoganathan (PCAAD) are available to testify to the Committee.

Best regards,
Drs. Serge Gauthier and Nathan Yoganathan, PCAAD Chairs

[10] In 2011, family caregivers provided 19.2 million unpaid hours of care, a number projected to double by 2031. For more information, see Government of Canada. 2016. Prevalence and monetary costs of dementia in Canada (2016): a report by the Alzheimer Society of Canada - HPCDP: Volume 36-10, October 2016 ; available at https://www.canada.ca/en/public-health/services/reports-publications/health-promotion-chronic-disease-prevention-canada-research-policy-practice/vol-36-no-10-2016/report-summary-prevalence-monetary-costs-dementia-canada-2016-report-alzheimer-society-canada.html

About PCAAD

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Contact information

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For additional information about PCAAD, visit: https://pcaab.ca

Annex

Leaders

- Dr. Serge Gauthier Global Center AD, McGill Center for Ageing and McGill University
- Dr. Marion Masellis, Sunnybrook Research Center and University of Toronto.
- Dr. Pedro Rosa-Neto, McGill Center for Ageing and McGill University
- Liam Kaufman, Winterlight, Toronto
- Dr. Christian Dansereau, Perceiv, Montreal
- Dr. Danica Stanimirovic, National Research Council
- Dr. John Gillard, KalGene, Montreal
- Sean McFadden, Euroimmune, Toronto
- Dr. Angela Rutledge and Jennifer Master, Victoria Hospital, London, Ontario, Western University.
- Dr. T. Nathan Yoganathan, KalGene, Toronto.

Partners

- **Ontario:** Winterlight Labs, NetraMark, KalGene, Ontario Brain Institute, Sunnybrook Research Institute, Vector Institute, Invest Ottawa, RetSpec, University of Ottawa (OHRI), University of Toronto, Victoria Hospital, Western University.
- **Quebec:** Caprion, Imeka Solutions, Perceiv, Optina Diagnostics, McGill University, Consortium for the Early Identification of AD.
- **Other:** Health Sciences Centre Winnipeg, Biomedical Transnational Imaging Centre, Halifax Centre for Clinical Research.