

# The Critical Value of a Dementia Innovation and Care Framework in Singapore

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# Introduction

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A perfect storm is coming — an exponential rise in dementia cases that appears inescapable in the absence of significant scientific breakthroughs in early diagnosis and treatment. The financial and social costs will be devastating for health and social care systems, the societal cost of dementia running into billions of dollars annually in Singapore alone. Singapore is at risk of being particularly impacted by this global trend due to the biggest risk factor for Alzheimer's disease: an ageing population.

Singapore has in place the building blocks of a world-class dementia innovation ecosystem. It is an innovator in dementia management, especially in healthcare system preparedness. However, the country's nascent dementia research efforts could be more developed and coordinated. Singapore's dementia innovation ecosystem could be improved through greater attention to issues of funding, data integration and support for drugs' clinical development (cohort development and clinical trials support/partnerships).

There is currently an opportunity for Singapore to take a stronger leadership role via the global Davos Alzheimer's Collaborative (DAC) initiative — a six-year plan to accelerate and diversify innovation in addressing Alzheimer's disease, established in January 2020 during the World Economic Forum's annual meeting — and in doing so further Singapore's status as a regional hub for biotech research and financial services. Close collaboration with DAC could lower dementia risk and lead to earlier diagnosis, extending and improving the lives of Singapore's ageing pioneer generation.

This paper examines the societal burden of dementia, the need for a concerted global response and Singapore's potential to play a more prominent role in defeating this disease. Singapore's dementia research innovation and care framework is critically assessed. An initial road map for dementia research funding and innovation is also presented.

# Dementia burden and the cost to Singapore

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Dementia is a global public health challenge. Worldwide, around 50 million people currently live with dementia, a number that is expected to grow to 82 million by 2030 and 152 million by 2050.<sup>1</sup> Dementia is the seventh leading cause of death globally, second among high-income countries.<sup>2</sup> The estimated annual cost of dementia in 2020 was over US\$1 trillion, a global financial burden that will double by the end of the decade.<sup>3</sup> Rapidly ageing populations and cardiovascular risk factors such as diabetes, hypertension and obesity are largely to blame.<sup>4</sup>

Risk reduction strategies and earlier diagnosis of dementia could extend and improve the lives of millions. To date, the scientific response has not been equal to the challenge. The biology is complex, stymying successful innovation in therapeutics. Dementia-related drug development has a high failure rate, not helped by challenging clinical trials due to limited cohorts. Before the US Food and Drug Administration (FDA) granted accelerated approval for Aduhelm (aducanumab) in June 2021,<sup>5</sup> the last drug class in Alzheimer's disease (AD) was approved globally in 2003. Since 2003, Alzheimer's drug development has proved challenging with a higher proportion of late-stage clinical trial failure when compared to other indications. While there is a debate over the effectiveness of aducanumab,<sup>6</sup> its approval marks a significant shift in the attitude of the FDA and a material change in the AD treatment paradigm.

There is still much to be done. Most research undertaken to date has also been concentrated in certain geographic regions. Some 79% of all genome-wide association study (GWAS) participants are of

European descent despite accounting for only 16% of the global population. Asians make up 60% of the world's population — and they are ageing too. There is an urgent need for the wider participation of Asian cohorts and more Asian clinical trials.<sup>7</sup>

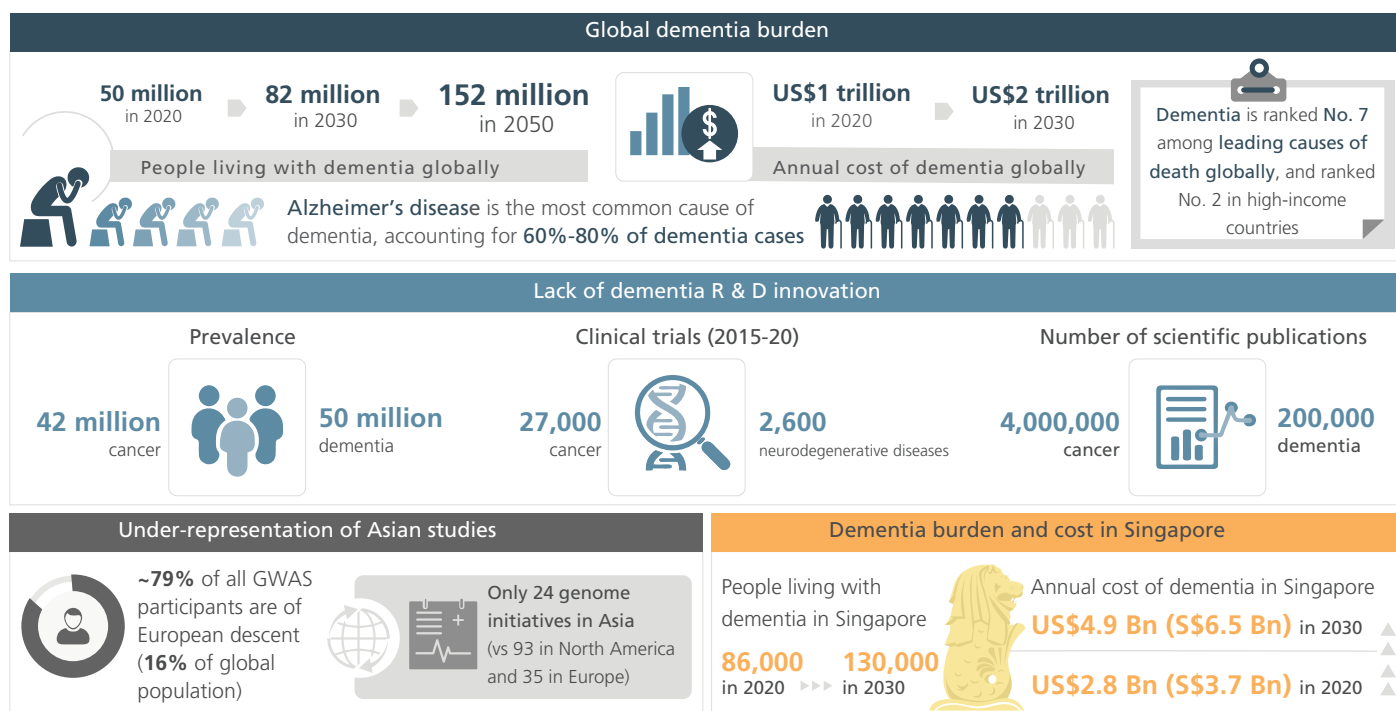
There is a gap between the impending societal burden and human cost of dementia and the research, innovation and resources applied to ameliorate the coming healthcare crisis. There is no disputing that health and social support systems are unprepared to meet the future demands of dementia care. Without a well-prepared dementia care delivery and support system that includes critical infrastructure for innovation, dementia cohort development and clinical trials may be insufficient to meet the R & D challenge.

## Singapore's dementia burden

In Singapore, one in 10 people age 60 and older may already have dementia, the equivalent of 86,000 persons in 2019 (see Figure 1). This burden is expected to reach at least 130,000 dementia sufferers by 2030,<sup>8</sup> driven by a growing senior population and increased comorbidity risks from diseases such as diabetes.

The societal cost of dementia to Singapore was an estimated US\$2.8 billion (S\$3.7 billion) in 2020, with the annual societal burden predicted to reach ~US\$4.9 billion (S\$6.5 billion) by 2030 (see Figure 2).<sup>9</sup> Social care (paid and unpaid) accounts for 76% of total societal costs for dementia, and the direct medical cost burden falls most heavily on the public sector (88% of direct medical costs), a higher proportion than for overall healthcare spending (~65% healthcare spend on public sector).<sup>10</sup>

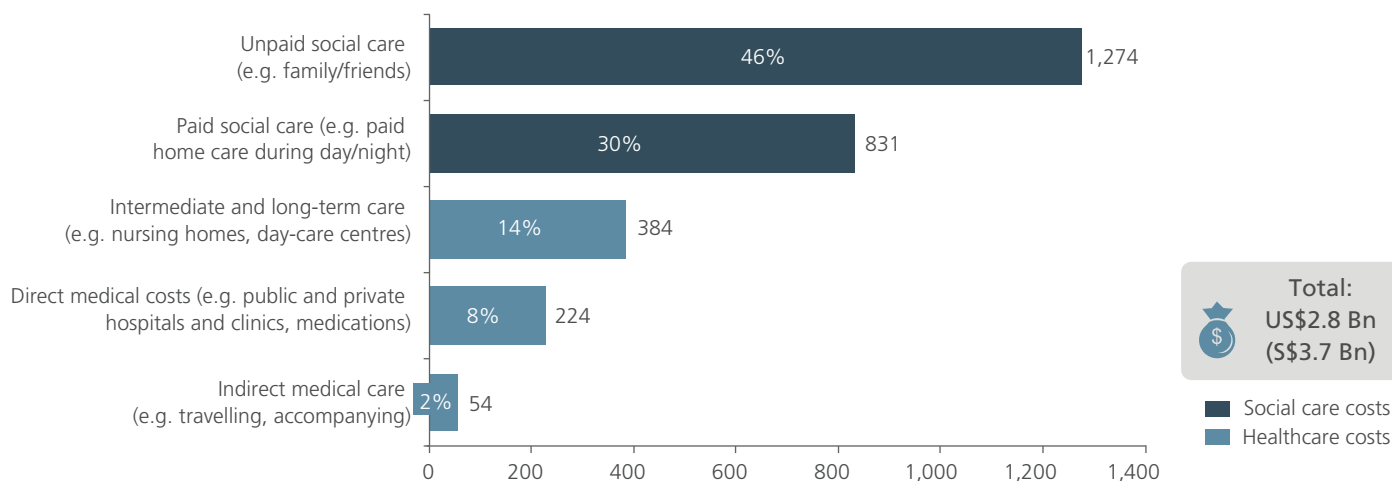
Figure 1  
Dementia burden globally and in Singapore



Source: Alzheimer's Disease International (ADI); Alzheimer's Association; A. R. Martin et al. (2019); World Health Organization (WHO); IQVIA; Dementia Singapore (DSG); Lien Foundation; E. Abdin et al. (2016); L.E.K. research and analysis

Figure 2  
Estimated total societal costs of dementia in Singapore

Estimated total societal costs of dementia in Singapore (2020)  
US\$ Mn



Note: L.E.K. estimate of Singapore's annual societal costs in 2020 is based on the 2015 total dementia cost and 2015-30 cost CAGR published by DSG; the dementia cost breakdown is based on E. Abdin et al. (2016)

Source: E. Abdin et al. (2016); Dementia Singapore (DSG); L.E.K. research and analysis

# Dementia innovation and care in Singapore: The current status

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Singapore ranks 16th in dementia innovation among 30 global cities. It has a national plan in place, a relatively well-established clinical research infrastructure and a renowned pro-innovation business environment. Its mid-table ranking reflects opportunities for improvement in several areas, including strengthening performance on early dementia detection and access to care.<sup>11</sup>

Singapore's **National Dementia Strategy (NDS)**, drafted by the Ministry of Health (MOH), is the country's principal dementia policy road map (developed in 2009, last updated in 2017).<sup>12</sup> The comprehensive and well-funded NDS blueprint includes a National Dementia Network (NDN) to seek feedback, and yet the plan is not publicly available. The plan adopts a multipronged approach encompassing nursing homes, community centres and day-care centres, as well as a community program to detect reversible risk factors. The strategy also foresees investment in early diagnosis through memory clinics in public hospitals. Community screening has yet to be approved due to concerns about the risk of false-positive results.

Singapore is active in several aspects of dementia research innovation. Reflecting NDS priorities, most progress has been achieved in expanding dementia care and support. The nation's nascent research efforts could be more developed and coordinated, nonetheless. Singapore's dementia innovation ecosystem could be improved through greater support for drugs' clinical development (cohort development and clinical trials support/partnerships), as well as enhanced funding commitment and policy communication. Ultimately, innovative drug discovery for dementia/AD will be a globally collaborative effort. Singapore can play its part by upgrading its infrastructure in support of clinical development.

## Innovation in clinical development

### Local cohort development — the need for greater integration

- Dementia cohort development is underway, led by the Memory, Ageing, and Cognition Centre (MACC) (two clinical and community-based cohorts) and the Singapore National Eye Centre, as well as by the National Neuroscience Institute (a hospital-based cohort for research on young-onset dementia).
- Strategic NDS weaknesses include the lack of data integration/harmonisation (e.g. a centralised database for imaging results, a centralised database for tissue and blood biomarkers), as well as the need for more R & D focus and funding commitment. While current cohort and clinical research projects are funded separately by the National Medical Research Council (NMRC), it is uncertain whether any dedicated funding is allocated to dementia research in the NDS.

### Clinical trials support platform — the need for more extensive research and improved infrastructure

- Singapore has strong imaging capabilities. Three of its main imaging centres have PET (positron emission tomography) imaging capabilities: the Clinical Imaging Research Centre at National University of Singapore (NUS-CIRC), RadLink and Advanced Medicine Imaging (AMI). While several important studies are ongoing, these are pilot/initial-stage trials characterised as sporadic endeavours with limited resources. Two milestone projects underway demonstrate the potential for innovative studies.
  - Led by the MACC, the SINGapore GERiatric (SINGER) intervention study to reduce physical frailty and cognitive decline is in its pilot phase. The aim is to develop scalable digital platforms and build partnerships for a larger definitive

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study in 1,200 elderly Singaporeans at risk for cognitive impairment and dementia.<sup>13</sup>

- The National Neuroscience Institute (NNI) registered a 25% increase in 2018 in the number of patients below 65 years of age with young-onset dementia. The NMRC awarded NNI a S\$1.7 million grant for further research on this topic.<sup>14</sup>
- To encourage more innovative, high-value dementia-related trials, several gaps in Singapore's clinical trials infrastructure need addressing:
  - **The need for faster trials approval:** While the Health Sciences Authority (HSA) is generally responsive, the institutional review board (IRB) process under the respective clusters is comparatively slow, extending approval times. Continued efforts to ensure the availability of dementia expertise within the IRB team would expedite the process for local and multinational corporation (MNC) sponsors alike.
  - **The need for a centralised trials resources deployment platform:** With increasing requirements for clinical trials (e.g. investigator and team, trials recruitment team with multilingual capabilities, advanced tech), Singapore can benefit from a cost-effective cloud clinical trials platform to share nationwide trials team resources across investigator teams. Researchers may also tap into cohorts and other trials resources in other established, complementary research initiatives.
  - **The need for more clinical trial awareness and participation:** Singapore is central to building cohorts and conducting clinical trials. Yet the awareness of, and participation in, dementia-related trials has been low historically. Singapore can benefit from conducting programs to lower stigma and encourage participation, showcasing the benefits of gaining access to treatment and moving the field forward.
- Globally, the centre of gravity for early-stage research and innovation in therapeutics across disease indications has shifted from large pharmaceuticals to biotech companies. As Singapore enhances its capabilities and infrastructure with regard to clinical trials and disease cohorts for dementia, it would also be well complemented with catalysing activity in the local biotech ecosystem, particularly in the area of neurodegeneration. A pipeline of biotechs will be one of the vehicles to translate new dementia-related assets into commercial products. However, there exists a limited pool of biotech companies conducting innovative drug development in Singapore, and few in the field of neurodegeneration and Alzheimer's disease. Hence, Singapore can benefit from a conducive biotech ecosystem consisting of access to experienced biotech executives and management, availability of long-term risk capital and government support, and a pipeline of assets from academia.
- An enhanced small and medium enterprise biotech ecosystem would further facilitate the establishment of technology-enabled development capabilities and focus dementia research in Singapore. These actions would allow the city-state to differentiate itself on the global stage, and in new ways — by building expertise in specific modalities such as small molecules, biologics or other novel modalities; focusing on high-value studies that require tech and expertise; establishing a competitive edge in speed of asset development; or accenting capabilities unique to Asian phenotypes/markets.
- Boosted by the recent approval of aducanumab, increased global and regional R & D activity in AD is expected in the coming years. Singapore can aim to be at the forefront of dementia research innovation by continuing to contribute to such innovative research initiatives with the support of its Asian cohort data and clinical trials support platform.

## Funding support for dementia innovation — the need for new funding sources and models

- Neurological and sense disorders are identified as one of the five therapeutic areas of focus by the MOH in Singapore's Research, Innovation and Enterprise 2020 (RIE2020) plan.<sup>15</sup> While some public funding is available for local research on dementia innovation (e.g. NMRC, no disease-specific funding has been earmarked for research on dementia/neurodegenerative diseases. Funding support for local biotech companies in early-stage discovery and drug development could also be enhanced.
- Looking beyond traditional public funding sources, Singapore could learn from the UK's Dementia Discovery Fund model<sup>16</sup> and explore new private funding sources specifically earmarked for dementia innovation (See section: Learnings from international dementia initiatives).

## Care and healthcare system preparedness — preparing for a paradigm shift in patient care

- The NDS focus on care provision for dementia/AD has supported multiple ongoing care and support programs that deliver excellent progress in this arena (see Figure 3). The recent approval of Aduhelm by the FDA will start a paradigm shift in the care and management of Alzheimer's disease and is likely to be followed by the approval of other innovative drugs. These new treatment options for patients will require more aggressive clinical regimens and new infrastructure to support diagnosis and monitoring as well as to administer treatments. As a global centre of excellence in healthcare, Singapore is well positioned to lead on these changes on a global stage as well as for the domestic population.
- Continued efforts are still needed to innovate access to care in the face of the rising need to provide community care support, fight social

Figure 3  
Key initiatives in dementia care innovation in Singapore



Mental health/dementia services have been set up in 14 polyclinics; over 220 general practitioner partners have been trained to diagnose and support persons with mental health conditions. Twenty-one community intervention teams have been established to provide allied health services such as psychosocial intervention and counselling (over 26,000 patients with mental health conditions have been supported by these teams as of December 2019).



To improve early diagnosis of dementia, MOH and the Agency for Integrated Care have been looking out for seniors exhibiting signs of dementia and refer suspected cases for further assessment. As of June 2020, 48 community outreach teams have been set up and have reached out to over 324,000 potential patients.



Singapore's first planned dementia care village is an excellent example of an innovative model to complement home-based care and dementia day care services. In 2019, the MOH and the Urban Redevelopment Authority (URA) piloted a residential care community concept for persons with dementia. The dementia care village is part of ongoing efforts to improve the quality of life for persons with dementia and to broaden the care and residential options available to them.



Non-profit organisations are actively involved in social/community care support. Dementia Singapore is experimenting with new care and engagement models (e.g. training church volunteers to host dementia patients during weekdays when churches are empty, and using iPads and robotic dogs to engage people with dementia).

Source: MOH Singapore; L.E.K. interviews, research and analysis

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stigma and support people with young-onset dementia. Enhanced research innovation could also create further downstream benefits in the dementia care ecosystem in Singapore.

## **Global collaboration opportunity for Singapore**

The Davos Alzheimer's Collaborative initiative presents a timely opportunity for Singapore to intensify its dementia research and care innovation (especially for clinical development, care, and health system readiness and funding support), diversify and extend funding sources for dementia innovation, enhance early detection, and improve the quality of life for elderly Singaporeans, their carers and their loved ones.

Established in January 2020 during the World Economic Forum's annual meeting, DAC is a six-year plan to accelerate and diversify innovation in Alzheimer's disease, with focuses on global cohort development, clinical trials support and healthcare system preparedness. Like Gavi, the Vaccine Alliance and the Coalition for Epidemic Preparedness Innovations (CEPI), DAC is a global public-private partnership that combines the strengths of government, academic and industry players to facilitate innovation and promote access to care.

To fund its global initiatives, DAC has raised US\$11 million in pledges as of mid-2021 with a target of US\$25 million by the end of the year. DAC also plans to boost investment over the five-year period 2022-26, by raising around US\$700 million globally from the private sector (including pharma companies, foundations and high net worth individuals) and governments to co invest in national dementia initiatives and infrastructure. In addition to endorsement by Klaus Schwab, founder and executive chairman of the World Economic Forum,<sup>17</sup> DAC has managed to gain key opinion leader support across public and private sectors, with leadership and advisors including former country heads, top executives in dementia-focused pharma companies, and leaders of key national and regional dementia research networks and foundations.<sup>18</sup>

DAC's deepening global integration represents an opportunity for Singapore to showcase its leadership as a research innovation and financial hub, helping DAC become the next Gavi or CEPI in the realm of dementia innovation. Further collaboration with such global dementia initiatives could help Singapore upgrade its research and care innovation infrastructure to better support a broader category of neurodegenerative conditions.

# Learnings from international dementia initiatives

While dementia research and care innovation is one of the seven World Health Organisation (WHO)-endorsed key action areas,<sup>19</sup> most national initiatives are more narrowly focused on allocating additional resources for dementia awareness and care. Worldwide, very few of the 30 or so national dementia plans in place include substantive attention to research or care data infrastructure for dementia.<sup>20</sup> This innovation deficit highlights a global imperative for better innovative

infrastructure and partnerships to facilitate global cohort development, clinical trials support platform, and healthcare systems preparedness.

## Lighthouse dementia initiatives

While global dementia research and care innovation is lacking, some developed markets have created pioneering programs in promoting innovation for both research and care, initiatives which may be relevant for the Singapore experience (see Figure 4).

Figure 4  
Pioneering national dementia plans

		UK	US	Japan	Australia	Korea
Overview of national dementia plans		<b>Prime Minister's Challenge on Dementia 2020 (2015)</b>  Successful example of top-down approach to promote research and care innovation	<b>National Plan to Address Alzheimer's Disease (2012); updated in 2019</b>  Strong funding support; key focus on research innovation and data systems	<b>The New Orange Plan (2015); new plan in development</b>  Ongoing efforts for both care and research innovation; strong support for community care and dementia-friendly initiatives	<b>National Framework for Action on Dementia 2015-2019</b>  Progress made in care and research, but inadequate funding and lack of evaluation metrics/outcomes in national plan remain key issues	<b>The 3<sup>rd</sup> National Dementia Plan (2015); government preparing for next plan</b>  Clearly defined strategy with transparent key performance indicators (KPIs); early stage of building integrated dementia databases
Overall strength in national dementia plan		●	●	◐	◐	◐
National plan focus and current efforts for WHO's 7 global action areas for dementia	Dementia as a public health priority	●	●	●	◐	◐
	Dementia awareness and friendliness	◐	◐	●	◐	◐
	Dementia risk reduction	◐	◐	◐	◐	◐
	Dementia diagnosis, treatment, care & support	●	◐	◐	◐	◐
	Support for dementia carers	●	◐	◐	◐	◐
	Information systems for dementia	●	●	◐	◐	◐
	Dementia research and innovation	●	●	◐	◐	◐

Source: Government websites; ADI; The Lien Foundation; Global Coalition on Aging; F. Sun et al. (2020); C. Edick et al. (2016); L.E.K. research and analysis

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- In 2015, the Prime Minister's Challenge on Dementia 2020 was launched in the **United Kingdom**, a top-down initiative with clearly articulated strategic focus and funding.<sup>21</sup> Key objectives in the plan include innovation both in care and support (equal access to diagnosis and meaningful care) and in dementia research (funding to double by 2025). The planned innovation came with specific evaluation metrics. The UK's dementia innovation ecosystem also benefited from London's hosting of the world's first G8 Dementia Summit in 2013 with the establishment of Dementias Platform UK (DPUK) in 2014 to integrate cohort data and allow for precision recruitment. Subsequently, these were followed by the establishment of the UK Dementia Research Institute (DRI) and Alzheimer's Research UK Drug Discovery Institute, focused on basic discovery and discovery by embracing new technologies and models. The Dementia Discovery Fund, established in 2015, is the world's only global specialized venture capital fund dedicated to supporting companies developing novel disease-modifying dementia medicines.
  - The **United States** National Alzheimer's Project Act (NAPA) was enacted in 2011, establishing the National Plan to Address Alzheimer's Disease a year later. The national plan, led by the National Institutes of Health (NIH), has substantial government funding support for its focus on research innovation and data systems. More broadly, America's national strategy outlines five R & D and care delivery goals: preventing and treating AD by 2025, optimizing care quality and efficiency, expanding support for persons with disabilities (PWDs) and their families, enhancing public awareness, and improving data and tracking.<sup>22</sup> The US government's funding for Alzheimer's and related research has had more than a seven fold increase since 2011; NIH is expected to spend US\$3.1 billion in FY2021, a \$300 million increase from FY2020.<sup>23</sup>
  - Since establishing the New Orange Plan in 2015,<sup>24</sup> **Japan** has continued to enhance its efforts in both research and care. The National Framework for Promotion of Dementia Policies was also announced in 2019. Following the creation of J-ADNI (Japanese-Alzheimer's Disease Neuroimaging Initiative) in 2007, Japan established the ORANGE Registry (Organized Registration for the Assessment of dementia on Nationwide General consortium toward Effective treatment) in 2015 to collect data on people with various stages of dementia. Then came IROOP (the Integrated Registry Of Orange Plan) in 2016, gathering data on healthy individuals to study pre-emptive medicines and lifestyle interventions.<sup>25</sup> Japan was one of the first countries to address dementia stigma, launching the Nationwide Caravan to train Ninchisho (dementia) Supporters in 2005, paving the way for other national initiatives globally, such as the Alzheimer's Society's Dementia Friends program in the UK.<sup>26</sup>
  - The National Framework for Action on Dementia 2015-2019 is the blueprint for **Australia's** national dementia strategy.<sup>27</sup> While the plan identifies priorities, it lacks specific target outcomes (e.g. target rates of diagnosis) beyond general statements.<sup>28</sup> Alzheimer's Disease International identified lack of funding commitment as another weakness.<sup>29</sup> The Australian Dementia Network (ADNeT) has established the Clinical Quality Registry (CQR) for newly diagnosed dementia or mild cognitive impairment. The ADNeT Registry is currently being piloted in memory clinics and dementia diagnostic services across Australia with a goal to ultimately incorporate all diagnostic settings and services in the country. As of August 2020, the ADNeT Registry has received governance approval for seven sites to participate in the registry, of which two sites have commenced data collection.

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- **Korea's** current national plan, The 3rd National Dementia Plan (2015), highlights community-based prevention and management, convenient and safe diagnosis, treatment and care, reduction of care burden for family caregivers, and support through research, statistics and technology.<sup>30</sup> The plan has clearly defined priorities and transparent KPIs, but five years on, Korea is still

in the process of improving access to care and building integrated dementia infrastructure. While dementia studies are ongoing (e.g. the Korean Longitudinal Study on Cognitive Aging and Dementia (KLOSCAD) launched in 2009), the country is still in the process of integrating its dementia-related databases, an objective of both the second and third national plans.

# Benefits of a dementia innovation and care framework for Singapore

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Some countries have made significant strides in promoting innovation in dementia (notably the UK and the US). Singapore has an opportunity to learn from these market leaders and then chart a course of its own by choosing to lead or participate in regional and global dementia initiatives.

The potential financial, societal and reputational benefits of a robust dementia innovation ecosystem will include more effective dementia diagnosis, treatment and follow-up care, as well as risk reduction, earlier detection and improved quality of life for patients. Such benefits go beyond therapeutic development successes.

Dementia costs the UK US\$36.6 billion (£26.3 billion) a year (2015 estimate). A treatment that delays the onset of Alzheimer's disease by five years could generate cumulative savings of around US\$139 billion (£100 billion) in 2020-2035, an average annual cost reduction of 25% over 15 years.<sup>31</sup> In Singapore, the same scenario would translate into savings of US\$700 million (S\$940 million) annually and accumulated savings of US\$10.5 billion (S\$14.1 billion) over 15 years.

Building a dementia innovation and care framework aligned with the DAC's innovation goals (see Figure 5) and selecting dementia as one of the next growth areas in biotech will generate significant healthcare, investment and reputational benefits for Singapore. Besides improving the quality of life for dementia patients, DAC alignment could secure long-term hub benefits:

**Singapore as a regional research hub:** Singapore could become a regional innovation hub to co-host regional data infrastructure with other DAC partners and co-manage Asian clinical trials in the region to contribute to DAC's global trial network. Singapore already has an established clinical research infrastructure and high-quality research teams in place. It has a heterogeneous population with diverse Asian

racial and ethnic groups of relatively equal economic status. Singapore could serve as a data privacy-compliant digital centre of excellence for data science and AI, a leading regional and global player in digital biomarker infrastructure/platforms, and an economic model for dementia research and data harmonisation. Overall, this will further build upon Singapore's capabilities and drive towards global recognition as a biomedical talent cluster and innovation hub.

Singapore could potentially co-lead efforts to shift from investigator-led to regionally coordinated alliances under DAC. Leveraging global/regional co-investment and partnerships, Singapore-based researchers would enjoy enhanced access to:

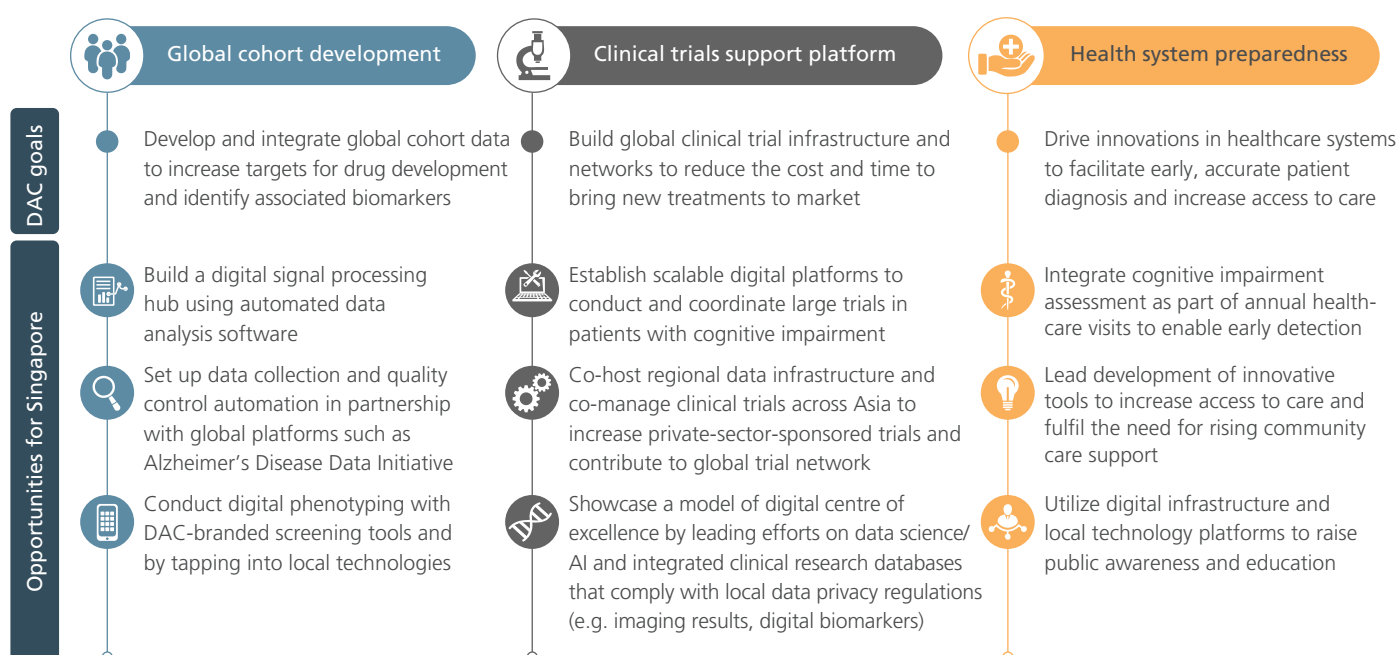
1. Established cohort and trials databases and best-practice sharing from global experts to build trial-ready digital cohorts and a national registry for Singapore; potential partners and example projects include the Alzheimer's Disease Data Initiative (ADDI) and the Trial-Ready Cohort for Preclinical/Prodromal Alzheimer's Disease (TRC-PAD)
2. Upgraded national research infrastructure co-invested in by Singapore and DAC and aligned to Singapore's disease priorities and DAC's global aims (e.g. cohort databases for imaging results and biomarkers, a clinical trials registry, a centralised trials resource platform coordinating researchers and trials recruitment nationwide)
3. Additional resources and activities co-invested in by Singapore and DAC to improve the quality of dementia research in Singapore (e.g. co funding of imaging tests for existing trials research in Singapore, including the SINGER study and the NNI research on young-onset dementia)

In the longer term, an upgraded ecosystem for dementia research reaching critical mass with a clinical trial framework and pro-innovation environment would attract further biotech opportunities, R & D and trials investment, and ultimately benefit the quality of life for Singaporean dementia patients and society as a whole.

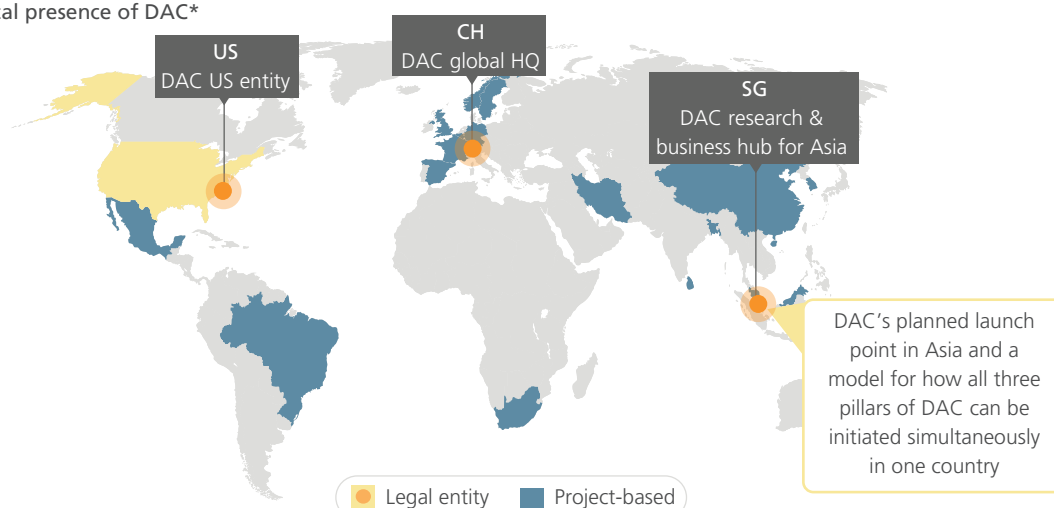
**Singapore as a business/financial hub and economic benefits:** Additionally, Singapore can position itself as a business and financial hub to support DAC's Asia-Pacific fundraising. DAC plans to raise US\$700 million globally over the next five years from the private sector and governments. The funds will be co-invested in national dementia initiatives and innovation infrastructure. Establishing a regional

affiliate/investment vehicle in Singapore to manage Asia-Pacific investor relationships and partners would be mutually beneficial for Singapore and DAC. Furthermore, there are potential economic benefits in the form of tax revenues on intellectual property given the significant unmet need for AD therapeutics and corresponding blockbuster potential for innovative drugs.

Figure 5  
Opportunities for Singapore with The Davos Alzheimer's Collaborative (DAC)



Planned geographical presence of DAC\*



\*Planned presence before the World Economic Forum's special annual meeting in August 2021 (as of 12 April 2021)

Source: The Davos Alzheimer's Collaborative; L.E.K. interviews, research and analysis

# What Singapore should do next

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In view of a rapidly ageing population, Singapore should take action to build on its domestic dementia innovation that extends beyond enhanced care. Similar to other leading nations, Singapore could lead the way globally by capitalising on its strong foundations in science, innovation and healthcare, and create a meaningful impact on this global issue whilst addressing a looming domestic crisis. A number of areas have been identified that could be addressed by building on inherent strengths and expertise in the Singapore ecosystem:

## Enhance strategic focus on research innovation

- Build out dementia therapeutic, diagnostic and biomarker data capability to fully leverage population data and local scientific teams
- Improve clinical trials and research support for dementia-related studies (e.g. accelerating IRB review timeline in relevant clusters for trials approval)
- Enhance integration of research platforms for more efficient resource allocation and lower research costs (e.g. centralised platforms for storing imaging results and biomarkers, a centralised online platform for dementia trials recruitment and coordination)
- Articulate the role of technology and digital infrastructure in dementia-related innovation (e.g. promote the use of electronic databases for biomarker depository, clinical trials and electronic health systems)

## Ensure policy communication and funding commitment:

- Enhance public communication of the NDS with clearly articulated strategic priorities
- Support and fund strategic priorities in the NDS with earmarked pools of capital
- Encourage and collaborate with private funders for public-private partnerships

## Continue efforts in care delivery and risk reduction:

- Support informal care and community support campaigns (e.g. dementia day-care centres, community outreach to ensure early detection)
- Continue to provide education and support for healthcare professionals (HCPs) and caregivers (e.g. promote workplace best practices)
- Work to mitigate modifiable risk factors for dementia, including continued efforts to reduce diabetes
- Continue to build population awareness and promote education in dementia and dementia care

## Establish better engagement among local stakeholders and global/regional partners:

- Expand the local dementia care ecosystem, including government agencies, HCPs, pharma/biotech companies, home care services, academia and patient advocacy/non-profit groups (e.g. DSG)
- Engage key global and regional partners to collaborate on dementia research and care innovation

The DAC is early in its development and is looking for key partners that will play a central role in building this global organisation. The unique value proposition of Singapore is recognised by the DAC leadership team, who are highly motivated to have the country play a pivotal role.

To enhance its dementia research and care innovation, Singapore could consider the opportunity to act as a significant participant in the DAC global initiative. Engagement with DAC would kick-start a number of the initiatives identified, including setting up cohort data collection and digital phenotyping capabilities, building local cohorts (that can be integrated into DAC's global platform), co-hosting regional trials data infrastructure, and co-managing regional clinical

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trials to contribute to a global trial network, as well as serving as a data privacy-compliant digital centre of excellence for data science and AI. Acting as DAC's headquarters within the Asia-Pacific area, Singapore could propel its national dementia innovation agenda by linking local researchers and stakeholders with some of the most promising global resources and networks offered through DAC. Internationally, this would allow Singapore to strategically position itself as the regional research and business centre for dementia innovation.

DAC is currently setting up its global organisation. While Singapore could consider an initial partnership which establishes itself as DAC's regional headquarters

in the Asia-Pacific area, further commitment to resources and funding can then be developed over time. Considering the value that DAC could provide to Singapore's domestic and international dementia agendas, a partnership model could be developed that is mutually beneficial to Singapore and DAC.

Like other global public-private partnerships such as Gavi, the Vaccine Alliance and CEPI, DAC has the potential to play a major role in the global fight against Alzheimer's disease, thereby addressing Singapore's domestic needs as well as international needs. Singapore would be well served to consider this opportunity as part of its broader dementia innovation action plan.

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## Endnotes

- <sup>1</sup> <https://www.alzint.org/u/from-plan-to-impact-2020.pdf>
- <sup>2</sup> <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death>
- <sup>3</sup> <https://www.alzint.org/u/from-plan-to-impact-2020.pdf>
- <sup>4</sup> <https://alz-journals.onlinelibrary.wiley.com/doi/full/10.1002/alz.12068>
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