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# IMPLICATIONS OF ALZHEIMER'S TREATMENT FOR ORGANIZATION AND PAYMENT OF MEDICAL PRACTICES IN CANADA

Technical Report

Soeren Mattke, Mo Wang and Andreas Ullrich

# USC Dornsife

*Center for Economic  
and Social Research*

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This research was sponsored by Roche, and conducted in the Center for Economic and Social Research, USC Dornsife College of Letters, Arts and Sciences.

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## OVERVIEW AND OBJECTIVES OF THE STUDY

As the COVID-19 pandemic has taught us, even the most sophisticated healthcare systems can be overwhelmed by sudden surges in the demand for services. The arrival of a disease-modifying treatment for Alzheimer's disease may result in a similar scenario, in which current healthcare system capacity is insufficient to cope with the expected

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influx of patients, who will seek diagnosis and treatment. Unlike the COVID-19 pandemic, there is still time for healthcare systems to prepare to ensure the needed capacity is in place to provide access to new disease-modifying treatments when they arrive. Time, however, is limited because recent trial results suggest that we may see the first disease-modifying treatments approved in the U.S. as early as 2021.

The challenge is that medical care for dementia is mainly focused on diagnosis and counselling at the moment. Patients may undergo neurocognitive testing to document and quantify the degree of impairment and, rarely, imaging and biomarker testing to identify the etiology. With the lack of disease-modifying treatment options, physicians are typically confined to managing symptoms and counseling patients and their families on the expected course of their disease and the consequences for their lives.

Combined with the fact that payment for labour-intensive diagnostic workups and counselling tends to be less well reimbursed than procedures, this lack of therapeutic consequences means that physicians currently have limited motivation to evaluate and formally diagnose patients with dementia. At the same time, the complexities of determining treatment eligibility and monitoring treatment response and side effects mean that Alzheimer's disease care will likely have to remain in the hands of specialists. Thus, the advent of a disease-modifying treatment for Alzheimer's disease will meet an unprepared healthcare delivery system. As we had shown in recent reports, the limited capacity of dementia specialists in Canada (Hlavka, Mattke, & Liu, 2019) will create substantial bottlenecks for treatment delivery that might be larger than those in the U.S., Japan (Mattke et al., 2019) and six European countries (Hlavka, Mattke, & Liu, 2019).

This project builds on this earlier work and analyzes how practice organization and payment models in Canada could be changed to accommodate the substantial increase in demand for dementia specialty care that a disease-modifying treatment for Alzheimer's disease will bring about.

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## TECHNICAL APPROACH

The study uses a combination of desk research and expert interviews to describe the current patient journeys nationally and in the four provinces of Alberta, British Columbia, Ontario and Quebec, to capture obstacles to access that result from these journeys and to identify potential changes to payment models and care delivery that might improve access. Desk research covered the websites of national and multilateral (e.g., OECD Health Data) organizations that publish health system capacity data, advocacy organizations (e.g., Alzheimer Society), payers and specialty societies as well as research published in peer-reviewed journals and technical reports. A total of 17 expert interviews were held with policy experts, clinical and health services researchers, clinicians and payer representatives in Canada with a focus on the four provinces using a semi-structured interview protocol.

We developed a stylized patient journey (Figure 1) to capture the current pathway that dementia patients take through identification based on screening or memory complaints, evaluation with neurocognitive testing, imaging and biomarkers and then finally diagnosis and treatment delivery.

*Figure 1: Stylized patient journey*



For each step of the patient journey, we analyze for each of the six countries the status quo regarding coverage, capacity and capabilities:



### Coverage

- Are the services under each step currently covered by health insurance?
- Are payment levels adequate to ensure actual delivery of the service?



### Capacity

- Is current capacity to deliver services sufficient to meet expected demand?
- Would the capacity actually be devoted to the respective care step, given prevailing incentives and organization of care?



### Capabilities

- Do providers have appropriate training, tools and technology to perform the required services?

We comment on possible changes to coverage, capacity and capabilities that might be required to reduce the obstacles to access to a disease-modifying treatment for Alzheimer's disease as well as memory care in general.

# RESULTS

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EQUITY OF ACCESS IS AN IMPORTANT PRINCIPLE IN CANADA, AND HOSPITALS AND FACILITIES MUST NOT BILL PATIENTS PRIVATELY FOR SERVICES COVERED UNDER THE HEALTH CANADA ACT, EVEN IF IT REDUCES WAIT LISTS

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benefits package of medically necessary hospital and physician services and specifies that provincial insurance plans must cover those services for eligible residents<sup>1</sup> without cost sharing to receive federal contributions. Equity of access is an important principle in Canada, and hospitals and facilities must not bill patients privately for services covered under the Health Canada Act, even if it reduces wait lists, a principle that was upheld by a recent decision by the Supreme Court of British Columbia (The Globe and Mail, 2020). Quebec is an exception because the province permits patients to pay for selected procedures and services privately to skip queues (Boyer & Laberge, 2007; Éditeur officiel du Québec, 2020; Richer, 2018). According to our experts, the decision was motivated by the intent to reduce wait lists without increasing public spending.

The minimum benefits package is updated annually and compliance of provincial plans within the rules and regulations of the Act is assessed (Health Canada, 2020). With federal contributions approximately a quarter of provincial and territorial health spending (Tikkanen et al., 2020), regional jurisdictions have a strong incentive to comply with federal requirements. While no payment or co-payment is required of patients, Canada has a gatekeeping system and most provinces pay lower rates for elective specialist consultations without a referral.

The organizational structure of healthcare in the provinces is largely similar, albeit with differences in the details. The Ministry of Health oversees financing and delivery of healthcare through health authorities and the

## HEALTH SYSTEM OVERVIEW

### **Overview of organization and governance**

Canada has a publicly financed healthcare system, in which the federal government sets a framework and implementation is devolved to the provinces and territories. The provincial and territorial systems fund their budgets from a combination of their own tax revenue and federal contributions that are based on risk-adjusted per capita payments. The federal Health Canada Act defines a minimum

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THE HEALTH AUTHORITIES ARE QUASI-INDEPENDENT PUBLIC BODIES THAT OPERATE FACILITIES, SUCH AS HOSPITALS AND DIAGNOSTIC IMAGING CENTRES, FOR A GIVEN REGION OR SERVICE LINE, WHEREAS THE PROVINCIAL HEALTH PLAN PAYS PHYSICIANS AND OTHER CLINICIANS FOR THEIR SERVICES.

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<sup>1</sup> Temporary legal visitors, undocumented immigrants, those who stay in Canada beyond the duration of a legal permit, and those who enter the country “illegally” are not covered by any federal or provincial program.



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OVERALL, 79% OF WORKING CANADIANS AND THEIR FAMILIES CARRY PRIVATE INSURANCE PLANS. APPROXIMATELY 10–20% OF CANADIANS REPORT HAVING NO OR INSUFFICIENT COVERAGE OF OUTPATIENT PRESCRIPTION DRUGS

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provincial health plan and operates public health as well as selected other programs directly. The health authorities are quasi-independent public bodies that operate facilities, such as hospitals and diagnostic imaging centres, for a given region or service line, whereas the provincial health plan pays physicians and other clinicians for their services. Facilities are mostly funded under global budgets with some activity-based payment elements emerging, particularly for hospitals (Sutherland et al., 2013).

Importantly, Canada does not have universal coverage of outpatient prescription drugs. The exclusion of prescription drugs was not intentional but a consequence of the gradual introduction of universal coverage through conditional grants from the federal government to provinces and territories (Brandt, Shearer, & Morgan, 2018). The introduction of a federal

benefit, often referred to as “National Pharmacare,” remains a topic of active policy debate (Daw et al., 2013). In 2018, the federal government convened an Advisory Council on the Implementation of National Pharmacare to advise on the implementation of a national benefit (The Advisory Council on the Implementation of National Pharmacare, 2018).

Prescription drug coverage may be provided by the provincial plans or by supplemental private health insurance that approximately two-thirds of Canadians carry (Brandt et al., 2018; Morgan & Boothe, 2016). The provincial plans typically cover the elderly and indigent as well as patients with selected high-cost conditions. Approximately 90% of private health insurance policies are purchased by employees, unions or professional associations through group plans, and the remainder by individual policyholders. Overall, 79% of working Canadians and their families carry private insurance plans (Canadian Life and Health Insurance Facts, 2018). Approximately 10–20% of Canadians report having no or insufficient coverage of outpatient prescription drugs (Angus Reid Institute, 2015).

Long-term care is not a benefit under the Health Canada Act. Provinces are offering or covering nursing home services in public facilities to members of their health plan with different income-based criteria for cost sharing. Wait times for public facilities can be six months up to two years, whereas beds in private-pay facilities are typically readily available (Fraser Health, 2020).

### **Provision of care**

Primary and outpatient specialty care is mostly provided by self-employed physicians in private

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practice or hospital outpatient departments. Patients are required to obtain a referral from their primary care clinician for specialty care, and most provinces pay specialists lower rates, if they see elective patients without a referral. According to the Canada National Physician Survey, most of the General Practitioners (GPs) (46%) work in group practices while some work in hospital-based practices (19%) or solo practices (15%) (National Physician Survey, 2014). Because the “founding bargain” of Canada’s healthcare system guaranteed physicians professional autonomy in exchange for submitting to a regulated payment system, any reforms have to be negotiated with the provincial professional organizations, and government agencies tend to make little use of their sweeping legislative powers to affect change (Hutchison et al., 2011).

At the heart of primary care reform in recent years was a shift to team-based models, similar to the GP practices in the U.K., which are larger physician-led groups with a variety of clinical and non-clinical staff. These team-based models facilitate task-shifting to nurse practitioners and other clinical and non-clinical staff, investment in technology and process improvement as well as a broader range of services. These models can be physically and/or organizationally integrated or network-based. Payment reform was an integral part of these models with a shift from fee-for-service to a blend of capitation, salary, fee-for-service and performance-based payment, as was the emergence of “tight rostering”, the registration of individuals with a specific family physician (Hutchison et al., 2011).

In Alberta, approximately 80% of family physicians operate under the Primary Care Network model, which consist of groups of physicians working with other health professionals, including nurses, dietitians, and pharmacists (Peckham, Ho, & Marchildon, 2018). In British Columbia, a joint committee of physicians and government, the General Practice Services Committee (GPSC), a joint commission of the Ministry of Health Services and the Medical Association, was established in 2002 with the expressed goal of gradually replacing small primary care practices with team-based family practices (Suter et al., 2017). GPSC launched the Divisions of Family Practice, 35 local networks of family physicians, which collaborate on community-level initiatives. Ontario has various co-existing models for team-based primary care that reach approximately 75% of Ontarians (Levesque et al., 2012).

In British Columbia, the GPSC collaborated on primary care reform to create Primary Care Networks (Cavers et al., 2010). Since it was launched in 2002, the GPSC has been committed to supporting family doctors and medical students specializing in family practice to increase capacity and access to high-quality care. For example, the GPSC provides a range of financial incentives to family physicians for additional hours and efforts in delivering longitudinal primary care. The GPSC also encourages family doctors to speak up about their concerns, issues, and recommended solutions to solve the problem of low morale and professional dissatisfaction (General Practice Services Committee, 2020).

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In Ontario, Community Health Centers, which are government-run clinics with salaried physicians, and Family Health Organizations, which are multidisciplinary primary care practices, became the dominant primary care models (Hutchison et al., 2011) in addition to salaried physician group models for remote areas (Hutchinson & Glazier, 2013). By 2012, approximately three-quarters of Ontario's population was enrolled in one of those models (Hutchinson & Glazier, 2013).

Family Medicine Groups (FMGs) were introduced in Quebec in 2000 to improve access to and quality of primary care. According to the 2020/2021 report from the Quebec Ministry of Health, 82% of residents are registered with an FMG, 7% are on a waiting list and 11% have no regular provider. However, access to primary care remains more challenging than in other provinces because a combination of long visit durations and shorter work hours results in fewer patients seen per physician (Canadian Institute for Health Information, 2020; Statistics Canada, 2019). The FMGs are multidisciplinary, team-based practices that are required to offer extended hours and implement electronic patient records (Breton et al., 2011). Some of the FMGs are linked to community health centres (centre local de services communautaires), which provide a wide range of preventive, medical and social services (Bozzini, 1988).

Specialists, who are also mostly independent practitioners, are typically hospital-based and only approximately a fifth of them work in solo practice (Canadian Medical Association, 2017). Payment for services tends to depend on the type of specialty. Whereas procedural specialists, such as surgeons and interventional cardiologists, are usually paid fee-for-service, a variety of payment models ranging from salary over capitation to fee-for-service is used for non-procedural specialists, such as geriatricians and psychiatrists. According to expert input, the fact that independent specialists are working in hospitals, which operate under global budgets, can create tensions about the use of expensive diagnostic technology, because the hospital has to absorb most of the cost.

## **Province-level organization and governance**

### **Alberta**

In Alberta, Alberta Health Services (AHS) is a unified health authority, which operates healthcare facilities as well as a variety of programs and services. AHS was formed in 2010 following the merging of agencies with responsibility for different regions and different service lines into a single entity (Duckett, 2011). AHS is a quasi-independent agency, whose board reports to the Minister of Health. The Alberta Health Care Insurance Plan (AHCIP), managed by the Ministry of Health, pays for medical care such as physician services, diagnostics and hospital care. Despite being the province with the highest GDP per capita, Alberta has relatively long wait times (Barua & Clemens, 2019). To improve access, the current government is pushing for an increased use of public-private partnerships, under which physicians or investors would provide the capital for new facilities, in exchange for long-term contracts for medical services (CBC News, 2020; Hardcastle & Ogbogu, 2020). The legislation, Bill 30, also contains provisions for increased direct contracting with physicians rather than payment via AHCIP. The controversial Bill is currently being discussed.

## **British Columbia**

In British Columbia, the Ministry of Health financially supports and works with provincial health authorities to provide medical services. The Provincial Health Services Authority operates specialized programs, such as the BC Cancer Agency and BC Transplant, and collaborates with the five regional health authorities on the planning and management of the populations in their respective geographic areas. As part of the provincial dementia plan, the province has invested \$25 million in the Brain Research Centre at University of British Columbia Hospital to support the development of the Djavad Mowafaghian Centre for Brain Health. The Medical Services Plan (MSP) is the provincial program paying for covered medical services. MSP enrollees may join a BC PharmaCare plan that covers prescription drugs, pharmacy fees, and medical supplies with income-dependent cost sharing.

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ALBERTA HAS BOTH THE HIGHEST TOTAL HEALTH SPENDING PER CAPITA AND PUBLIC SECTOR SPENDING PER CAPITA. BRITISH COLUMBIA, ONTARIO, AND QUEBEC SPEND A SIMILAR AMOUNT ON HEALTHCARE PER CAPITA, RESULTING IN INVESTMENT BELOW THE CANADIAN NATIONAL LEVEL

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## **Ontario**

In Ontario, the Ministry of Health and Long-Term Care is responsible for financing medical care through the Local Health Integration Networks (LHINs) and the Ontario Health Insurance Plan (OHIP) (ClosingtheGap Healthcare, 2018). The 14 LHINs are in charge of planning and operating facility-based care delivery for their respective areas, including a means-tested benefit for long-term care homes. In December 2019, Ontario started to integrate the healthcare system further by consolidating five provincial agencies into Ontario Health and the 14 LHINs into five interim and transitional geographic regions. The OHIP is paying independent clinicians and is operating OHIP clinics. Selected high-cost conditions, such as cancer and hepatitis C, are funded through a separate program.

Ontario provides drug benefits to qualified residents through six provincial drug programs. Ontario Drug Benefit (ODB) is the main prescription drug plan that covers approximately 4400 prescription drugs in the formulary list for residents over 65 years old. Residents with special care needs, living in long-term care homes, or 24 years old and younger without private insurance may also qualify for ODB before reaching 65 years of age. People pay a deductible and co-payment of the prescription drug based on their after-tax annual income and marital status. Ontario's Trillium Drug Program provides coverage of listed prescription drugs for Ontario residents with high prescription drug cost relative to household income. Ontario also operates dedicated programs for certain diseases.<sup>2</sup>

## **Quebec**

In Quebec, permanent residents must have prescription drug coverage insurance either provided by employers and professional groups or covered by the Régie de l'assurance maladie du Québec. People must join a private plan if they have access to one and are under 65 years old. People without the access to a private plan or having financial

<sup>2</sup>New Drug Funding Program; Special Drugs Program; Inherited Metabolic Diseases Program; Respiratory Syncytial Virus Prophylaxis for High-Risk Infants Program; Visudyne Program.

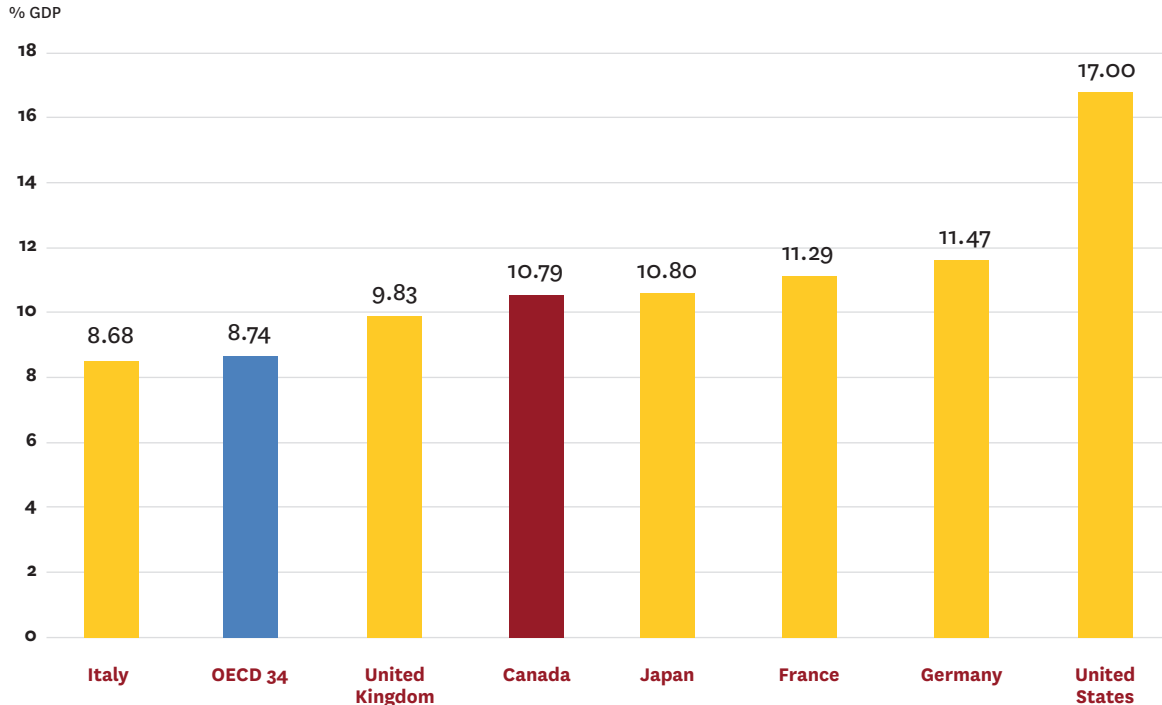
difficulties are eligible for the Public Prescription Drug Plan. Residents in Quebec will be automatically registered with the public plan at the age of 65 and can decide under which plan to be covered. The Public Prescription Drug Plan covers more than 8000 prescription drugs, approximately twice as many as Ontario's, and the pharmacist's professional fee with a monthly deductible of \$21.75. Once the deductible is paid, people pay 37% of the covered cost until the maximum contribution is reached. The rates for the deductible and co-insurance are adjusted each year on July 1. The Minister of Health and Social Service makes the final decision of drug coverage and replacement following the recommendations made by the Institut national d'excellence en santé et en services sociaux (INESSS). The coverage of a private insurance plan must be at least equivalent to that of the public drug plan. Reportedly, this alignment between the public and private drug benefits and the universal requirement to carry prescription drug coverage allows the province to negotiate better prices from manufacturers. Some experts cautioned, however, that such pressure on prices might discourage pharmaceutical companies from introducing new medicines in Quebec.

## Financing healthcare

With approximately 11% of GDP, operational spending for healthcare in Canada is comparable to France, Germany and Japan (Figure 2).

*Figure 2*

### Health spending as a share of GDP, 2017 (or nearest year)



Source: OECD Health Statistics (2017)



The amount of health spending per capital varies slightly among the four provinces (Table 1). Alberta has both the highest total health spending per capita and public sector spending per capita. British Columbia, Ontario, and Quebec spend a similar amount on healthcare per capita, resulting in investment below the Canadian national level (Canadian Institute for Health Information, 2019b).

**CANADA'S CAPITAL INVESTMENT IN HEALTHCARE INFRASTRUCTURE TENDS TO BE LOW COMPARED WITH OTHER G7 COUNTRIES**

Table 1

### Total and public sector health spending per capita, 2019

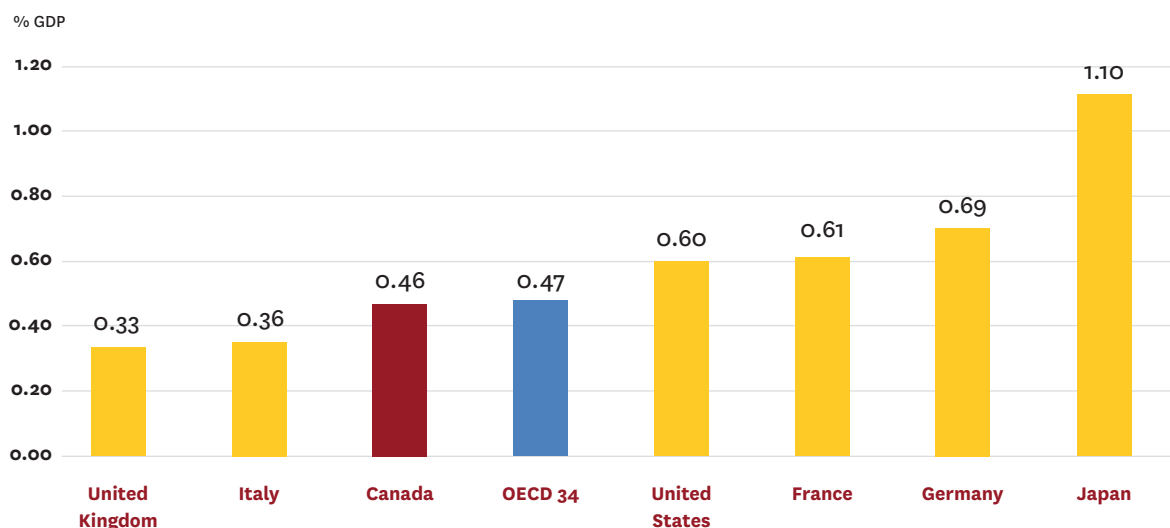
	Total health spending budget per capita (\$)	Public sector health spending budget per capita (\$)
Alberta	\$7,658	\$5,187
British Columbia	\$6,548	\$4,259
<b>Canada</b>	<b>\$7,068</b>	<b>\$4,603</b>
Ontario	\$6,953	\$4,385
Quebec	\$6,935	\$4,581

Source: Canadian Institute for Health Information (2019b)

However, Canada's capital investment in healthcare infrastructure tends to be low compared with other G7 countries, with Italy and the United Kingdom being the only ones with lower investment levels relative to GDP than Canada. Whereas France, Germany and the U.S. invest approximately 30% more and Japan more than twice as much as Canada (Figure 3) (OECD, 2017; Teja et al., 2020).

Figure 3

### Gross fixed capital formation in the healthcare sector as a share of GDP, 2015 (or nearest year)

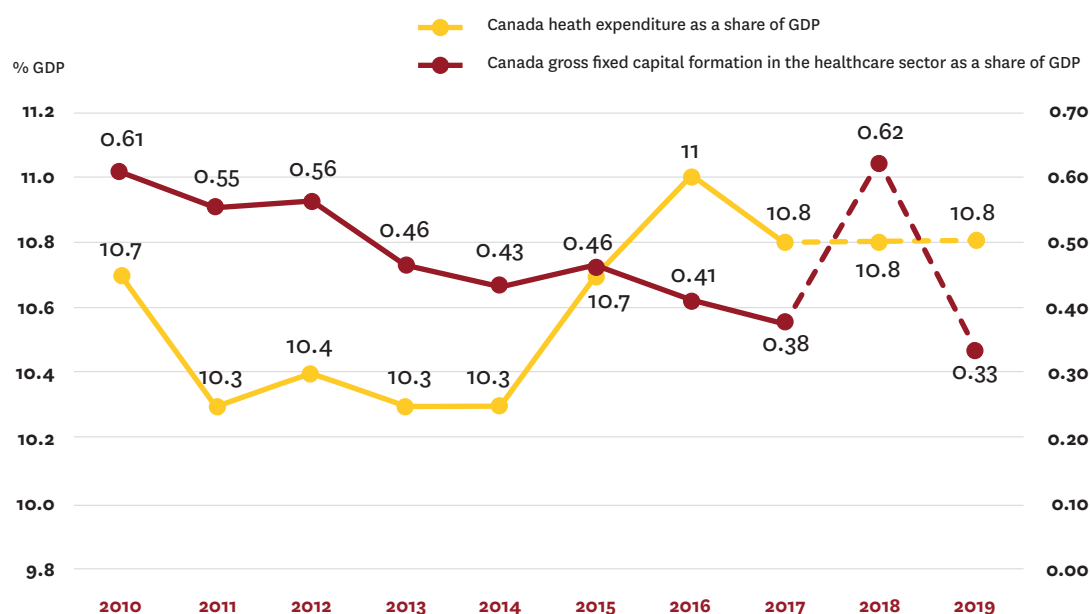


Source: OECD Health Statistics (2019)

Moreover, operational spending has remained stable between 10% and 11% of GDP over the past decade, whereas investment levels have declined by almost half (Figure 4). According to expert input, there are two reasons for the comparatively low investment levels. The first is that Canada relies on supply-side constraints to ensure budget discipline, especially for the provincial health plans. The second is that the majority of the 2.5 million people who make up the healthcare workforce in Canada are unionized public sector employees, limiting the scope for the government to achieve cuts to labour budgets (Statistics Canada, 2020). In addition to restrictions on investment for facilities and technology, provinces use price regulation, global budgets and quotas for nurses and physicians to contain costs (Tikkanen et al., 2020).

**Figure 4**

### Trends in operational spending and capital investment in Canada



Source: OECD Health Statistics (2019)

Physicians traditionally bill provinces directly on the basis of a regulated fee schedule.

AS WITH MANY NATIONAL STRATEGY DOCUMENTS, THE REPORT SUGGESTS ASPIRATIONAL TARGETS BUT ONLY A LIMITED NUMBER OF CONCRETE ACTIONS

More recently, other payment arrangements, such as capitation, have been introduced in primary and to some degree in specialty care. The contribution of alternative payment models to gross clinical payments increased from approximately 10% in 1999–2000 to over a quarter in 2017–2018, ranging from 36% in Ontario to 13% in Alberta (Table 2) (Canadian Institute for Health Information, 2019c). Many physicians continue to receive both fee-for-service payments and alternative models (Health Canada, 2020).

*Table 2***Contribution of payment type to overall physician payment**

	Alternative payment models	Fee-for-service
<b>Alberta</b>	13%	87%
<b>British Columbia</b>	20%	80%
<b>Canada</b>	27%	73%
<b>Ontario</b>	36%	64%
<b>Quebec</b>	20%	80%

Source: Health Canada (2020)

Alternative payment models are more common in family practice (Canadian Institute for Health Information, 2019c). Approximately a third of primary care physicians, but approximately half of medical and two-thirds of surgical specialists receive 90% or more of their remuneration based on fee-for-service. Only 5% of surgeons but 16% of family doctors are paid 90% or more under alternative models. According to our experts, there are substantial differences in the relative weight of alternative payment models between the medical specialties. While procedural specialists, such as interventional cardiologists, are largely paid like surgeons, conservative specialties, such as geriatrics and general neurology, receive a large share of their pay through alternative models.

## DEMENTIA PLANNING

Canada's National Dementia Strategy was published in 2019 and puts forward a vision "to create a Canada where all people living with dementia and caregivers are valued and supported, and experience an optimal quality of life and where dementia is prevented, effectively treated and better understood". It mentions advancing curative therapies as a national objective and points to health system capacity and workforce development as research priorities. As with many national strategy documents, the report suggests aspirational targets but only a limited number of concrete actions. Also at the national level, the Canadian Consensus Conference on the Diagnosis and Treatment of Dementia is an expert group that has developed guidelines since 1989 and speaks to many questions along the patient journey (Ismail et al., 2020).

These national efforts are paralleled by provincial initiatives to develop dementia strategies. A summary of the focus areas of the national and provincial plans is provided in Table 3. Consistent with findings by Edick et al. (2017), priority themes and actions show substantial consistency across jurisdictions.

The Alberta Dementia Strategy and Action Plan 2017 focuses on brain health and support of patients through all stages of dementia (Alberta Health Continuing Care, 2017). British Columbia's 2012 Provincial Dementia Action Plan formulates priorities and actions for healthcare system and service redesign with a focus on primary and community care (British Columbia Ministry of Health, 2012) and the 2016 Provincial Guide to Dementia Care in British Columbia assessed progress and laid out next steps (British Columbia Ministry of Health, 2016). Ontario released a discussion paper to solicit input on a comprehensive dementia



strategy in 2016 (The Ministry of Health and Long-Term Care, 2016). After the change in government in 2018, the initiative is now referred to as dementia policy.

For Quebec, a government-appointed task force identified seven priority actions and related recommendations for dementia in 2009, which were translated by a ministerial team into an implementation strategy with a focus on primary care (Quebec Committee of Experts, 2009). The implementation strategy was rolled out in three phases. The main objective of phases 1 and 2 was to integrate dementia services into primary care coordinated by the Research Institute of the McGill University Health Centre (Réseau universitaire intégré de santé et services sociaux [RUIS]) and three other RUIS centres (McGill, 2018). In phase 1, the provincial health authority financed training for a pilot group of family physicians and expanded it to a larger group in phase 2. An evaluation found that the training helped to absorb more patients with dementia into the healthcare system without increasing the number of specialist visits (Vedel et al., 2019). Phase 3, which has not been implemented yet because of COVID-19, focuses on strengthening the collaboration between family physicians and specialists (Boudreau, 2019).

In addition, Quebec has launched the Consortium for the Early Identification of Alzheimer's Disease–Quebec (Belleville et al., 2019), a prospective cohort study to collect clinical, neuropsychological, and neuroimaging data as well as specimens with the objective to identify early-stage biomarkers of Alzheimer's disease, similar to Italy's Interceptor Project (Interceptor, 2019).

**Table 3**

### Elements of national and provincial dementia plans in Canada

	Alberta	British Columbia	National	Ontario	Quebec
Identify and address risk and protective factors	●	●	●	●	●
Support development of disease-modifying treatments			●		
Improve awareness and reduce stigma	●	●	●	●	●
Promote early detection and diagnosis	●	●	●		
Support and train family caregivers	●	●	●	●	●
Increase capacity and capabilities of community & social organizations	●	●	●	●	
Improve quality of long-term care or end-of-life	●	●	●		
Enhance the ability of primary health care	●			●	●
Stimulate dementia research		●	●		
Build capable dementia care workforce		●	●		
Prepare for a disease-modifying treatment	●	●	●	●	
Monitor further implementation of dementia plan (action plan)	●	●			
Public funding			●	●	

Source: Edick et al. (2017)

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CURRENTLY, THE CANADIAN TASK FORCE ON PREVENTIVE HEALTH CARE ADVISES AGAINST SYSTEMATIC SCREENING FOR MCI BECAUSE OF LACK OF EVIDENCE FOR BENEFITS OR HARMS AND INSUFFICIENT EVIDENCE FOR BENEFIT OF TREATING MCI

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## SCREENING FOR MCI

Coverage of screening programs is a provincial decision (Health Council of Canada, 2014). Currently, the Canadian Task Force on Preventive Health Care advises against systematic screening for mild cognitive impairment (MCI) because of lack of evidence for benefits or harms and insufficient evidence for benefit of treating MCI (Pottie et al., 2016). Experts represented in the 5th Canadian Consensus Conference on the Diagnosis and Treatment of Dementia as well as other experts (Chambers, Sivananthan, & Brayne, 2017) concur with that assessment, stating lack of evidence, but emphasized the need for vigilance in patients at risk for dementia, such as the very old, those with other neurological conditions and those with cardiovascular risk factors (Ismail et al., 2020). Provincial guidelines, for

example in British Columbia (British Columbia Ministry of Health Guidelines & Protocols Advisory Committee, 2014) and Quebec (Institut national d'excellence en santé et en services sociaux, 2015), equally recommend to not screen asymptomatic patients. Some experts recommend opportunistic screening of older adults, who present with complaints suggestive of cognitive decline (Molnar & Frank, 2020).

## CASE FINDING

Canada has a high number of primary care providers per capita compared with all other G7 countries except France (Figure 5). As mentioned previously, family physicians play an important role in the Canadian healthcare system, as gatekeepers for access to specialty care and as main providers of longitudinal care, whereas specialists mostly serve in a consultative capacity. While access to primary care is not considered constrained overall, approximately 15% of Canadians do not have a primary care provider (Malko & Huckfeldt, 2017) and many rural areas are considered underserved (Shah et al., 2020).

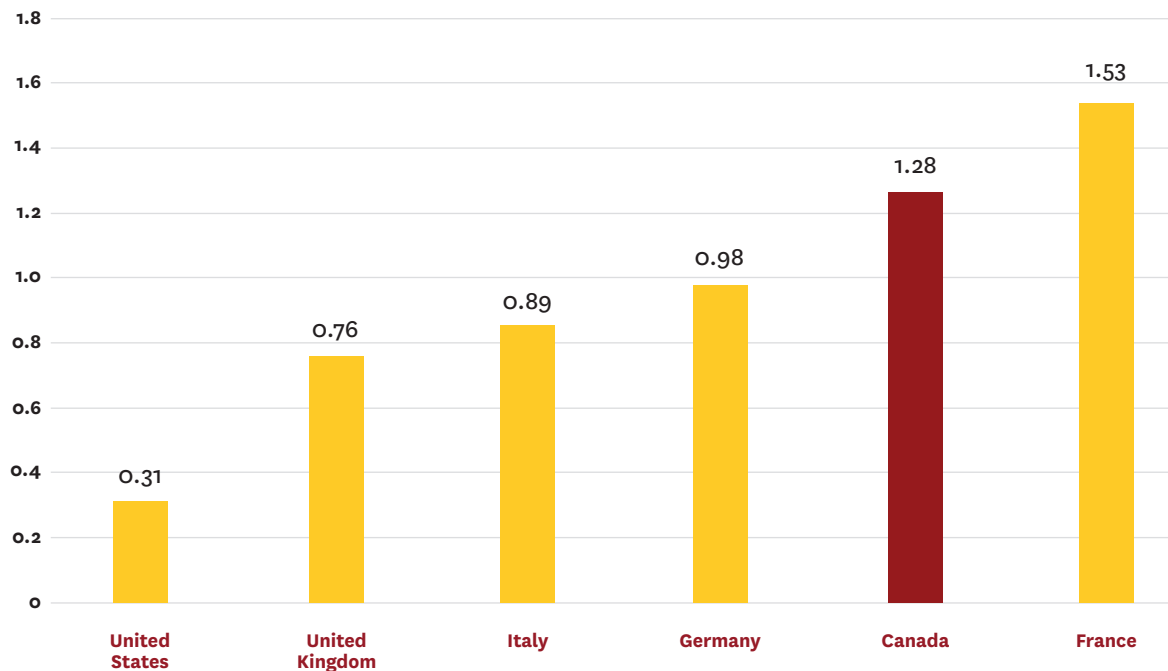
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THE NUMBER OF FAMILY PHYSICIANS PER CAPITA DIFFERS SUBSTANTIALLY BY PROVINCE. ALBERTA, BRITISH COLUMBIA, AND QUEBEC HAVE APPROXIMATELY 10% MORE THAN THE CANADIAN AVERAGE WHILE ONTARIO HAS 20% FEWER FAMILY PHYSICIANS

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Figure 5: Number of primary care physicians in G7 countries, 2016

### GPs per 1,000 population [2016]

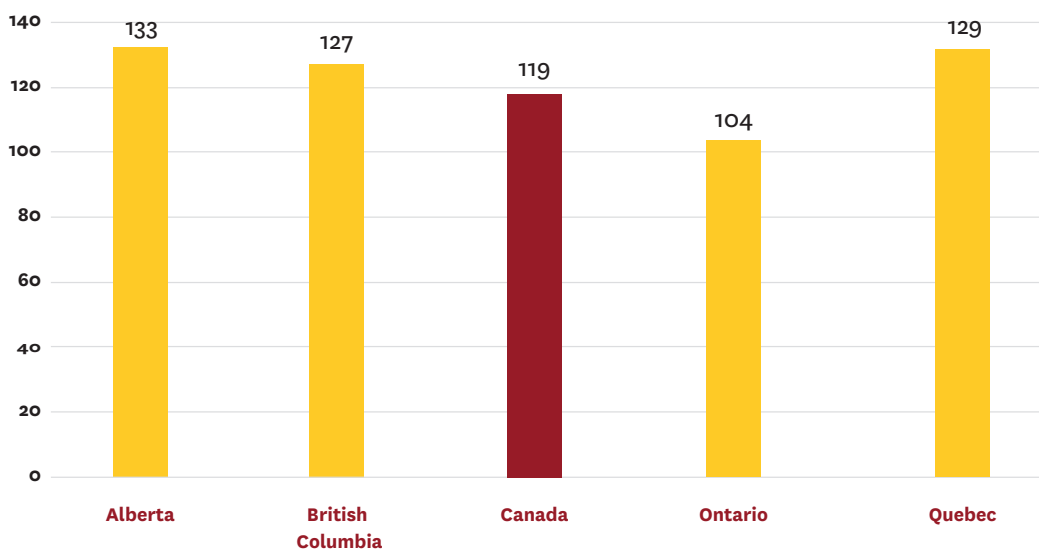


Source: OECD Health Statistics (2019). Data for Japan are unavailable as Japan does not classify physicians into primary and specialty care

The number of family physicians per capita differs substantially by province. Alberta, British Columbia, and Quebec have approximately 10% more than the Canadian average while Ontario has 20% fewer family physicians (Figure 6) (Canadian Medical Association, 2019a).

Figure 6

### Family physicians per 100,000 population by province



Source: Canadian Medical Association (2019a)

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OVERALL, HOWEVER,  
EXPERTS BELIEVED THAT  
DEMENTIA REMAINS  
SUBSTANTIALLY  
UNDERDIAGNOSED AND IS  
USUALLY DIAGNOSED ONLY  
IN ADVANCED STAGES

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The initial assessment of a subjective memory complaint in the primary care setting is a covered benefit with dedicated payment in all provinces. In Alberta, British Columbia and Quebec, it is covered as part of comprehensive geriatric assessment with 2020 payment rates of \$313.79, \$291.50 and \$238.15, respectively (British Columbia Ministry of Health, 2020; Government of Alberta, 2020; Régie de l'assurance maladie du Québec, 2020). In Quebec, there are add-on payments for managing vulnerable patients; however, no specific payment rate for the assessment of memory complaints is listed in the payment schedule for general practitioners (Santé

Montréal, 2020). In Ontario, the 2020 rate is \$67.75 for a cognitive assessment as part of an office visit (Ontario Ministry of Health, 2020). According to expert input, those payment rates are appropriate for the workload, assuming that family physicians are compensated fee-for-service.

The 5th Canadian Consensus Conference on the Diagnosis and Treatment of Dementia posits that primary care clinicians are able to diagnose most forms of dementia (Ismail et al., 2020) and the current consensus is that patients with cognitive decline should be primarily managed in family practice, except for rapidly progressive or unusual cases (Moore et al., 2014). To support family practitioners, several provinces have issued decision guides or clinical guidelines (Accelerating Change Transformation Team, 2017; British Columbia Ministry of Health Guidelines & Protocols Advisory Committee, 2014; Collette & Robitaille, 2015; Institut national d'excellence en santé et en services sociaux, 2015).

However, concerns have been raised about the ability of family practitioners to identify early stages of memory loss (Aminzadeh et al., 2012), and our experts mentioned reservations about burdening family practices with additional responsibilities without proper training and support. Reportedly, the readiness of family practitioners to properly evaluate subjective memory complaints varies widely, with younger physicians more likely to use standardized protocols and larger practices more likely to have the flexibility and support staff to craft workflows that permit adding this complex task. Overall, however, experts believed that dementia remains substantially underdiagnosed and is usually diagnosed only in advanced stages. For example, a study in Ontario suggested that 31% of nursing homes residents with cognitive decline were not diagnosed and approximately 24% and 36% had MCI and mild dementia, respectively (Bartfay, Bartfay, & Gorey, 2013).

Two advances in technology could facilitate evaluation of memory complaints in primary care. The first would be the development of simplified cognitive assessment tools specific to early-stage symptoms into commonly used electronic health records. The second would be the regulatory approval and coverage of a blood-based test for Alzheimer's disease pathology, given promising results for test kits that are suitable for commercial deployment (Palmqvist et al., 2019). The latter would be particularly important in light of a potential disease-modifying treatment, as the test would allow prioritization of patients for further assessment who are likely to be eligible for treatment.

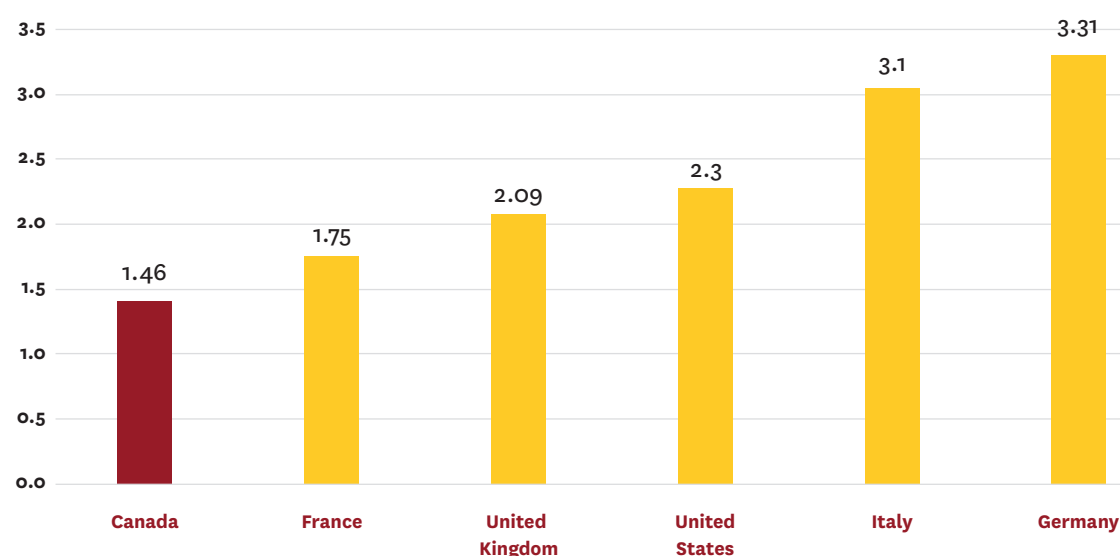
In turn, greater familiarity with cognitive evaluation brought about by better tools might help family practices streamline their processes and train support staff to take over selected tasks. Canada was also one of the first countries to introduce primary care-led memory clinics, which would reduce the need for specialty care (Lee et al., 2014).

## COGNITIVE TESTING

Formal neurocognitive testing is a covered benefit for patients with suspected cognitive decline and would be conducted in hospital clinics or independent practices. Reportedly, payment levels tend to be adequate if specialists work under fee-for-service arrangements. Although Canada has a comparatively high number of family doctors, it has the lowest number of any specialists per capita among the G7 countries (Figure 7). According to expert input, the comparatively low number of specialists is due to challenges in workforce planning. While the Ministry of Health sets annual targets for the numbers of residency training slots in each specialty, the medical faculty decides how many slots to offer, which commonly leads to mismatches between supply and demand. According to OECD data, Canada is heavily reliant on physician immigration, as approximately a quarter of the workforce is foreign-trained (OECD Health Statistics, 2019).

Figure 7

### Specialist medical practitioners per 1,000 population, 2018



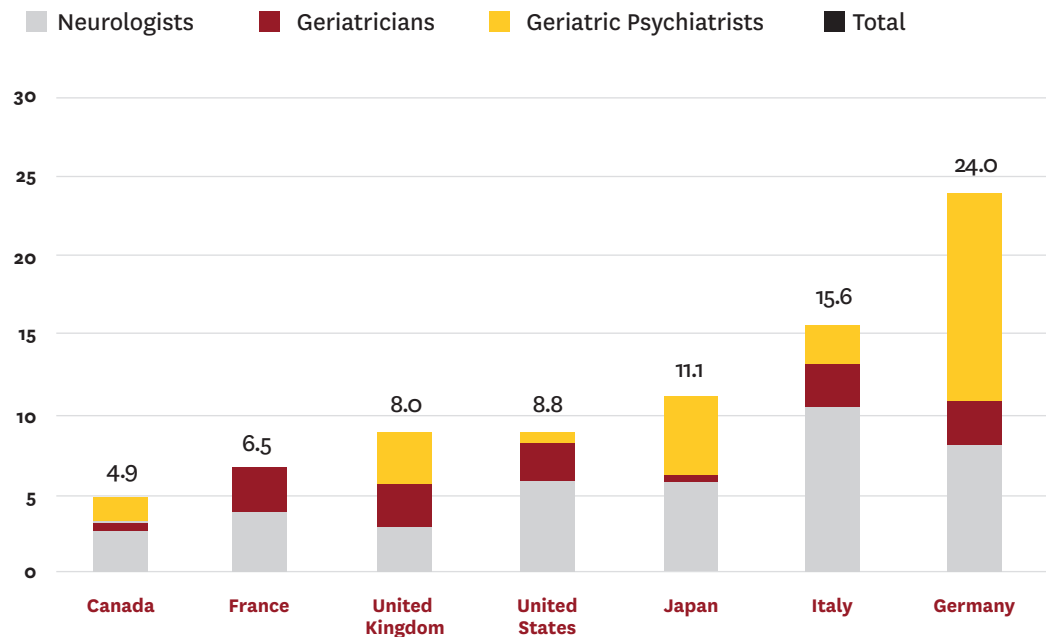
Source: OECD Health Statistics (2019). Japan does not report data for general practitioners and specialists separately

THE COMPARATIVELY LOW  
NUMBER OF SPECIALISTS  
IS ALSO REFLECTED IN  
DEMENTIA CARE, WHERE  
CANADA HAS THE LOWEST  
NUMBER PER CAPITA  
AMONG THE G7 COUNTRIES

The comparatively low number of specialists is also reflected in dementia care, where Canada has the lowest number per capita among the G7 countries (Figure 8). Our experts also cautioned that those estimates reflected the number of specialists whose training would equip them to evaluate and treat patients with dementia and that the actual practice may look quite different. In particular, neurologists who are not practising in dementia clinics rarely provide longitudinal care.

Figure 8

## Number of dementia specialists per 100,000 population in G7 countries

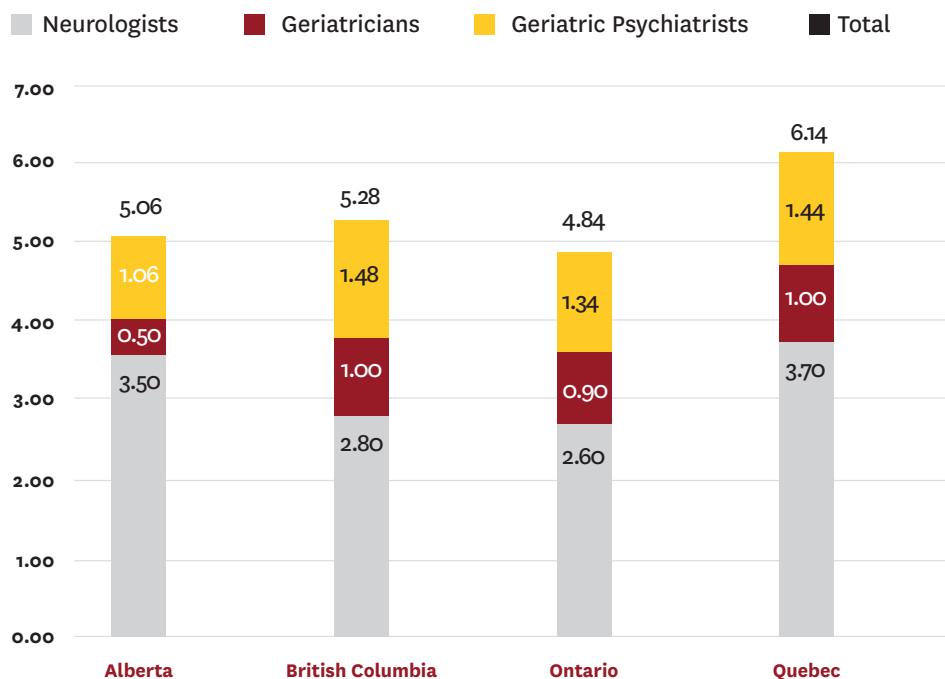


Source: Hlavka, Mattke, & Liu, 2019 ; Mattke et al. (2019); Liu et al. (2017); Liu et al. (2019)

As Figure 9 shows, the number<sup>3</sup> of dementia specialists per capita is similar in the four most populous provinces.

Figure 9

## Dementia specialists per 100,000 population by province and specialty



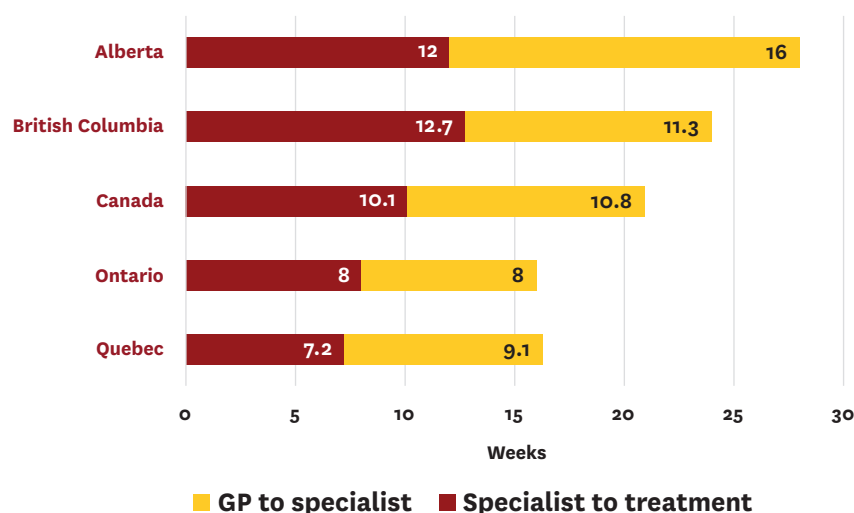
Source: Canadian Medical Association (2019b)

<sup>3</sup> The national and provincial estimates for number of specialists per capita use different data sources and therefore give slightly different results.

As a result of the low specialist density, wait times for specialty services are common in Canada. Median wait times between referral from a GP and receiving specialist treatment increased from 19.8 weeks in 2018 to 20.9 weeks in 2019, as shown in Figure 10.

*Figure 10*

### Median time from referral by GP to treatment, by province, 2019



We could not identify systematically collected data on wait times for dementia specialist consultations, but expert opinion puts them at approximately three to six months. One publication reported median wait times for geriatricians between 21 and 32 months in rural southern Ontario (Lee et al., 2018). Based on medical record review, there is an estimated median wait time of 96 days for a neurologist appointment in Ontario (Liddy et al., 2018). Another study covering primary care clinics across Canada reported median wait times of 89 and 105 days for psychiatry and neurology, respectively (Liddy et al., 2020).

With the scarcity of specialists and heavy reliance on family physicians, primary-care focused memory clinics emerged early in Canada. Primary Care Collaborative Memory Clinics (PCCMCs) originated in Ontario in 2006 to address specialist capacity constraints in dementia care (Lee, Kasperski, & Weston, 2011). PCCMCs are multidisciplinary teams that include one

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PRIMARY CARE  
COLLABORATIVE MEMORY  
CLINICS (PCCMCs)  
ORIGINATED IN ONTARIO  
IN 2006 TO ADDRESS  
SPECIALIST CAPACITY  
CONSTRAINTS IN  
DEMENTIA CARE

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or two primary care practitioners (PCPs), two to three nurses, a social worker and administrative support staff. Depending on resource availability, some PCCMCs also include a pharmacist, an occupational therapist and even representatives from the local Alzheimer's disease association to provide additional information, education and support to patients and their caregivers. While PCCMCs are led by specially trained PCPs in their routine operations, designated specialists are available to each memory clinic for consultation via telephone or email. Referral to specialists is reserved for complex cases, which leads to a substantial shortening of wait times for specialty care (Lee et al., 2018).



A different model emerged in the form of a specialist-led approach with integration of community providers in the Geriatric Assessment and Intervention Network in rural Ontario (Peterborough Regional Health Centre, 2020). In Alberta, the Care of the Elderly Program was developed at the University of Alberta in Edmonton in 1993 (Charles et al., 2014). This six- to twelve-month program provides additional training in geriatric medicine for medical residents. In Quebec, a collaborative care model for memory services was introduced at primary care level at both Family Medicine Groups and the government-run clinics (Cliniques Réseau) following the 2013 Quebec Alzheimer's Plan. The objective was to empower PCPs and nurses to detect, diagnose and care for patients with dementia.

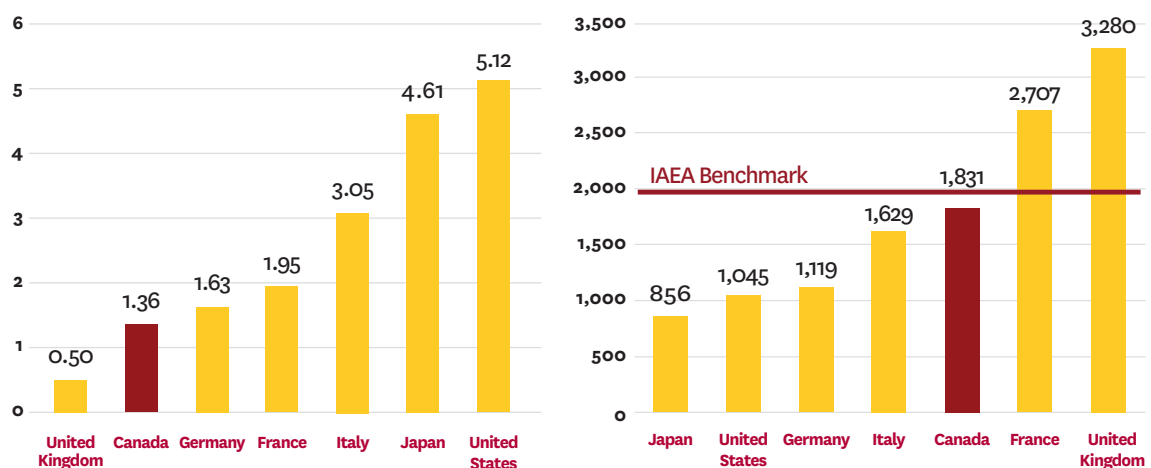
CANADA HAS ONE OF THE LOWEST NUMBERS OF PET SCANNERS PER CAPITA AND HIGHEST UTILIZATION RATES AMONG THE G7 COUNTRIES, SUGGESTING LIMITED CAPACITY

## BIOMARKER TESTING

Neither positron emission tomography (PET) scans nor cerebrospinal fluid (CSF) tests for beta-amyloid are currently covered for the routine evaluation of patients with cognitive decline, even though both tests are approved by Health Canada. The Canadian Agency for Drugs and Technology in Health (CADTH) does recommend PET scans for dementia if its etiology remains unclear after magnetic resonance imaging (MRI), but in reality access is highly limited outside of clinical trials and reserved for unusual cases with early onset or rapidly progressive memory loss (CADTH, 2014). The main reason is lack of capacity. Canada has one of the lowest numbers of PET scanners per capita and highest utilization rates among the G7 countries, suggesting limited capacity (Figure 11). According to our experts, existing PET scanners are almost exclusively used in oncology.

Figure 11: Density and utilization of PET scanners in G7 countries

### PET scanners per 1 million population



Source: OECD Health Statistics (2019); The German Society for Nuclear Medicine (DGN) (2019); NHS England (2019)



Longstanding skepticism about value for money has led to a relatively late adoption of PET scanning in oncology, and initially scans were only covered in Alberta and Ontario. With a growing number of indications, more devices were added and other provinces began to cover the technology, but capacity expansion never kept pace with growing demand, because of a combination of limited capital investment budgets and a complex decision process. While the exact process will differ by province and current government policy, it has multiple decision points that can slow down or preclude installation of a new device.

For facility-based devices, the applicant needs to prepare an internal proposal to install a new device, including a business case and total cost of ownership analysis, which is vetted by several committees considering competing priorities and potential space considerations. Once the decision to request an additional scanner is made, the provincial health authority and the professional association have to agree to move forward. For academic medical centres, the Ministry of Education may be involved because it employs the medical faculty. The final recommendation needs to be approved by the Ministry of Health, which submits a budget request to the Treasury for the initial investment into the device itself and potential building modifications and the additional operating cost. Once approved, the necessary building permits and the approval of the Canadian Nuclear Safety Commission need to be obtained and the work on installation

can begin. According to expert input, this process can take several years from the initial request to assumption of service with limited predictably at every decision point.

Academic medical centres commonly have foundations through which donors can finance the acquisition of new technology, but they are not permitted to cover operating cost. As an added complexity, approval and funding of a new device do not automatically guarantee that use of that device is reimbursed under the provincial health plan, i.e., it is possible that a device may be used only for research. Similarly, radiologists in private practice can decide to finance the acquisition of a scanner but would have to negotiate a service contract with the provincial health plan for reimbursement.

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THERE ARE ALSO DIFFERENCES IN ACCESS TO PET SCANS ACROSS AND WITHIN PROVINCES IN THAT QUEBEC HAS TWICE AS MANY DEVICES PER CAPITA AS ONTARIO AND FOUR TIMES AS MANY AS BRITISH COLUMBIA. GIVEN THE VAST SIZE OF THE COUNTRY, GEOGRAPHIC OBSTACLES TO ACCESS ARE COMMON.

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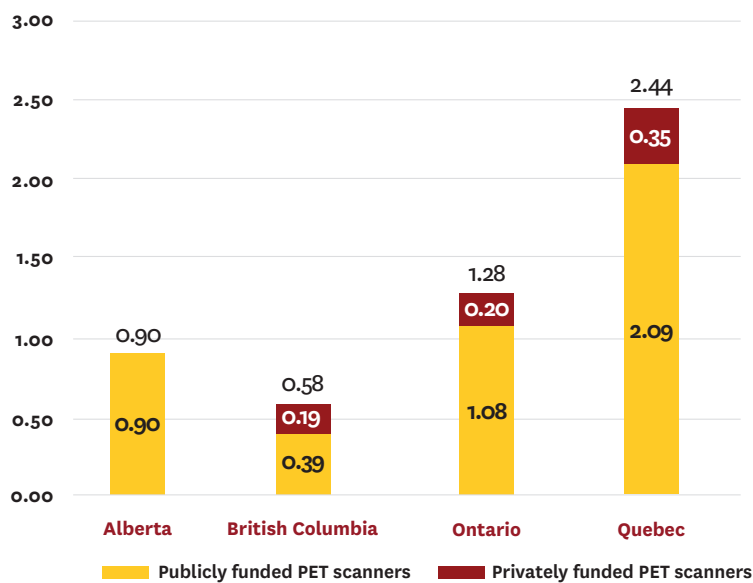
DIAGNOSTIC LUMBAR PUNCTURES HAVE BECOME AN UNCOMMON PROCEDURE IN CANADA AND ARE MOSTLY CONDUCTED IN INPATIENT SETTINGS BY NEUROLOGISTS AND INTERVENTIONAL RADIOLOGISTS

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There are also differences in access to PET scans across and within provinces in that Quebec has twice as many devices per capita as Ontario and four times as many as British Columbia (Figure 12). Given the vast size of the country, geographic obstacles to access are common. As we had shown earlier (Liu et al., 2019), scanners and cyclotrons are concentrated in the populated band along the Canadian–U.S. border. The short half-life of the ligand for beta-amyloid testing exacerbates the challenge. For example, we learned that amyloid PET scans are currently not available in Calgary, Canada's fourth largest city, because of the distance to the nearest cyclotron.

**Figure 12**

### Number of PET scanners per 1 million residents in four provinces



Source: CADTH (2015)

Whereas CSF testing can theoretically be scaled and expanded to less populated regions more easily, experts were cautious about patients' acceptance, because of

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**A LIKELY PATH TO CREATING SUFFICIENT TESTING CAPACITY IN CANADA IS THE INTRODUCTION OF BLOOD-BASED BIOMARKERS FOR THE ALZHEIMER'S DISEASE PATHOLOGY**

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concerns about discomfort and complications, and the limited number of sites that conduct them on a routine basis. As a result, diagnostic lumbar punctures have become an uncommon procedure in Canada and are mostly conducted in inpatient settings by neurologists and interventional radiologists. In addition, we were unable to confirm that any labs in Canada have the capability to conduct beta-amyloid testing in CSF samples, and currently specimens are being sent to the U.S., Denmark and the Netherlands for processing.

It is possible, but by no means guaranteed,

that a test for Alzheimer's disease pathology would be covered and probably required by payers, if a disease-modifying treatment were covered. In that case, expansion of biomarker testing capacity will be needed. Our experts voiced mixed views on which path this expansion would take. Increased use of CSF testing was seen as preferable because of the lower fixed cost and higher scalability, in particular in less populated areas. However, experts voiced concerns about lack of training and facilities outside of specialist clinics and cultural aversion to lumbar punctures. In particular, PCPs are unlikely to conduct these procedures, as they are not compatible with their practice workflow and thus not economically viable. In Quebec, the performance of lumbar punctures is now part of the training of specialized nurse practitioners (Santé Montréal, 2020).

Installing additional PET scanners will run into the above-mentioned constraints, which makes it unlikely that substantial capacity will be added in time to diagnose patients when a treatment is initially approved. In light of those constraints, a likely path to creating sufficient testing capacity in Canada is the introduction of blood-based biomarkers for the Alzheimer's disease pathology. Recent studies have shown that fully automated blood tests for beta-amyloid (Palmqvist et al., 2019) and tau (Palmqvist et al., 2020) have achieved levels of sensitivity and specificity that allow using them as triage tools in the evaluation process of patients with cognitive decline. A recent study projected that the use of a blood test in patients with suspected MCI, based on the Mini-Mental State Examination, can reduce the need for confirmatory testing by 30% (Mattke et al., 2020).

## TREATMENT DECISION

An office visit with a dementia specialist to discuss results from the neurocognitive evaluation and biomarker testing in order to decide on eligibility for disease-modifying treatment would be covered as routine care. As mentioned earlier, specialist capacity is widely regarded as insufficient with significant reported wait times and with limited room to expand volume, particularly in rural areas.

## TREATMENT DELIVERY

The decision to cover a drug follows a formal process for the public plans. After regulatory approval by Health Canada's Health Products and Food Branch, CADTH, an independent, non-profit body, conducts a health technology assessment covering clinical effectiveness, safety and cost-effectiveness. The assessment, called the Common Drug Review (CDR) process, provides joint advice for all provinces except Quebec, which maintains its own process evaluated by INESSS. INESSS uses an evaluation process similar to the CDR with the exception of giving credit to the innovation and future potential of a new treatment (Sikich et al., 2017).

Based on the findings from the review process, the Canadian Drug Expert Committee provides a non-binding recommendation to provincial authorities that a drug should be reimbursed, be reimbursed with conditions, or not be reimbursed. Although CADTH does not make price recommendations, its findings will affect later price negotiations.

For example, in the case of a recommendation of coverage with conditions, one of those conditions can be a lower price.

Following the completion of the CDR, the pan-Canadian Pharmaceutical Alliance (pCPA), a purchasing consortium of all provinces and territories, negotiates the price of a drug with the manufacturer. The negotiations can be led by the pCPA central office or by one or two jurisdictions on behalf of all members of the alliance. Although the targeted time to complete the pCPA negotiations is 140 days after the CADTH recommendation is published, a recent study showed that the process took an average of 357 days in the second half of 2016 (Salek et al., 2019). Providers of provincial drug plans can then decide whether or not to include the drug in the respective formularies, given the negotiated price, which commonly involves another review.

For example, to be considered covered by BC PharmaCare, the drug needs to be reviewed by the Drug Benefit Council once the CDR is complete. Final coverage decisions, including the type of coverage and specific plans under which a drug will be covered is made, will consider recommendations from CDR and the Drug Benefit Council, budget impact, and current PharmaCare policy priorities. In Ontario, the Committee to Evaluate Drugs (CED) is an independent advisory committee that reviews evidence and provides recommendations. The Executive Officer of the Ontario Public Drug Program makes the final coverage decision based on expert recommendations (CDR, CED), stakeholder input, pCPA negotiation results, and budget impact.

Private insurers conduct their own assessment process and make formulary decisions independently, albeit often informed by the CADTH process. In Quebec, all private plans are required to cover at least the medications covered by the public plan. The Canadian Life and Health Insurance Association, as the representative of private insurers, negotiates prices with manufacturers.

Overall, formularies of private plans tend to be broader than those of public plans (OECD Country Profile, 2014). For example, a study (Kratzer et al., 2013) found that 94% of private plans in Canada included all approved prescription drugs in their formulary. They also reported that 87% of the 491 new drugs approved by Health Canada from 2009 to 2018 were covered by at least one private plan, whereas 47% were covered by at least one public plan. Average wait time for first listing was 152 days for private plans, which was much shorter than the 473 days for public plans (Canadian Health Policy Institute, 2019). We also learned from our experts that coverage decisions are sometimes influenced by public pressure. For example, cancer care is organized and funded by a separate agency in all provinces, which creates greater flexibility within an earmarked budget. Another example is the success of Dr. Julio Montaner, a pioneer of HIV/AIDS research and treatment in Canada, who combined high-profile research and advocacy to make British Columbia one of the earliest adopters of a treatment as prevention strategy with triple therapy of antiretrovirals (Pirisi, 2006).

In parallel to those negotiations, the Patented Medicine Prices Review Board (PMPRB), a federal consumer protection agency, benchmarks drug prices against those in countries of comparable wealth (Clement & Memedovich, 2018). If the PMPRB considers a price to be excessive, the manufacturer must reduce the price and offset the excessive revenue by making a payment to the government of Canada.

According to expert opinion, Quebec’s drug benefit tends to be more generous than that of the other provinces, in particular for high-cost specialty drugs, whereas general medicine drug coverage is largely similar (Morgan et al., 2009). As mentioned previously, the public plan in Quebec covers almost twice as many drugs as its Ontarian counterpart, and per capita spending on outpatient prescription drugs by the public plan is higher in Quebec than in the other three provinces (Table 4) (Canadian Institute for Health Information, 2019b).

Table 4

Outpatient prescription drug spending per capita by province

	Public plan	Private plans
Alberta	\$387	\$474
British Columbia	\$267	\$394
Ontario	\$435	\$566
Quebec	\$462	\$565

Source: Canadian Institute for Health Information (2019b)

Infusion capacity

We were unable to identify data on infusion capacity in Canada but were advised by our experts that intravenous delivery of a treatment was not likely to become an obstacle to access, because there is a network of private infusion facilities that are usually funded by the products’ manufacturers (Janssen BioAdvance, 2019). Moreover, some disease-modifying treatments in development are for oral or subcutaneous application.

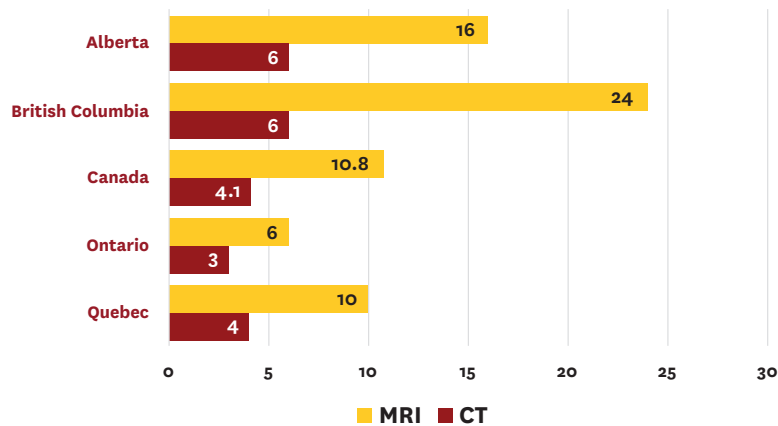
MONITORING

Office visits and imaging for monitoring of treatment effect and safety are likely to be covered in line with the drug’s label and guidelines. Capacity for MRI scanning is likely to create a bottleneck, as Canada has substantial wait times for elective diagnostic imaging already. Average national wait times are 4.8 weeks for a CT scan and 9.3 weeks for an MRI scan, with British Columbia and Alberta having above-average wait times, as shown in Figure 13 (Barua & Moir, 2019).

CAPACITY FOR MRI  
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FOR ELECTIVE DIAGNOSTIC  
IMAGING ALREADY

Figure 13

### Wait times for elective diagnostic procedures in weeks

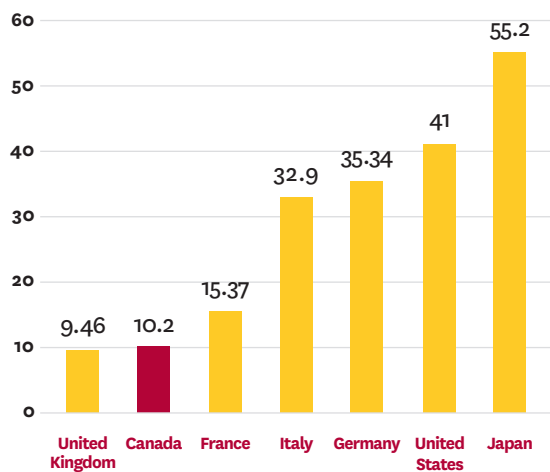


Source: Barua & Moir (2019)

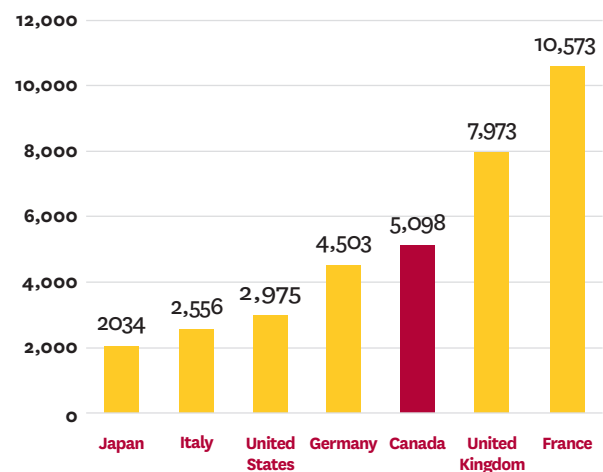
An important reason for the wait times is a combination of low device density and high utilization compared with other G7 countries (Figure 14). Similarly, capacity for follow-up visits with specialists may be limited as outlined above.

Figure 14: Density and utilization of MRI scanners in Canada compared with other G7 countries

### MRI scanners per 1 million population



### Annual MRI scans per device



Data from OECD Health Statistics (2019)



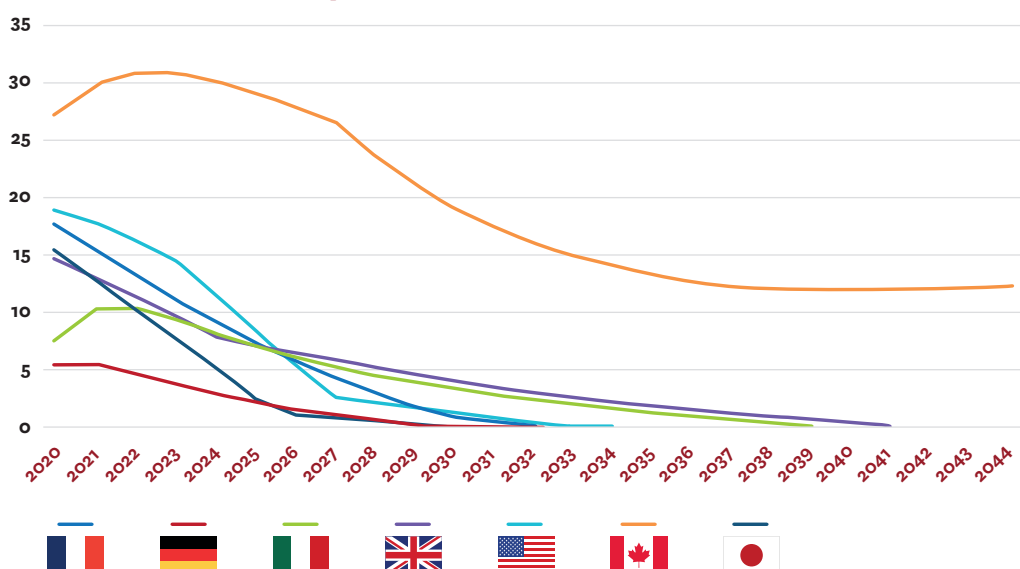
## SUMMARY

Our analysis suggests that Canada is facing the twin problems of low density of dementia specialists and limited capacity for biomarker testing. The combined effect of those two constraints means that Canada will have the longest and most persistent wait times for a disease-modifying treatment among the G7 countries (Figure 15). Not only is the initial projected wait time approximately 25% higher than in the U.S., which is the country with the second highest initial wait times, but Canada is also the only G7 country in which wait times in excess of one year are estimated to persist for decades. This finding is somewhat surprising, because Canada spends about the same share of GDP on healthcare as France, Germany and Japan, but it is the logical consequence of the fact that Canada relies heavily on supply-side restrictions to contain healthcare cost. Investment levels in healthcare infrastructure are below the OECD average and approximately 25% lower than in France, Germany and the U.S., and they have been declining over the past decade.

CANADA IS FACING THE TWIN PROBLEMS OF LOW DENSITY OF DEMENTIA SPECIALISTS AND LIMITED CAPACITY FOR BIOMARKER TESTING.

Figure 15

### Projected wait times for Alzheimer's disease diagnosis and treatment in G7 countries



Supply-side restrictions are also used to manage prescription drug spending, because the lengthy health technology assessment and price negotiation process means that around one and a half years pass between regulatory approval and a coverage decision by the providers of the public plans. Although this delay allows for predictability in spending on prescription drugs, as the impact of new medicines can be both accounted for and managed, it deprives Canadians of timely access to new treatment options. Moreover, as most of the patients with early-stage Alzheimer's disease will be members of public drug plans given the age

distribution of the disease, provinces might make different decisions about coverage of a disease-modifying treatment because of its sizeable budget impact.

A fundamental change in these constraints seems unlikely in the short run, as they reflect long-standing policy and tight public finances because of the COVID-19 pandemic. However, the topic of the future of healthcare may warrant a deep policy debate in due course, because delayed and varying access to novel treatments appear inconsistent with the Canadian ideals of equity and social protection. A sound debate might also lessen the risk that allocation decisions are unduly influenced by advocacy efforts as opposed to social welfare considerations.

Necessity being the mother of invention, Canadians have substantial experience working around the capacity constraints.

Much like the GPs in the U.K., family physicians, of which Canada has more than most G7 countries and about four times as many as the U.S. per capita, have taken on responsibilities that firmly lie in the hands of specialists in many other countries. Primary care-led memory services have emerged in several provinces, and ongoing efforts to consolidate primary care into larger practices will allow for internal specialization and a greater degree of task shifting to other clinical and non-clinical staff. Although promising, these care models would have to evolve considerably to handle a disease-modifying treatment, because their current focus is diagnosis, counselling and referrals to social services rather than the medicalized nature of the treatment. Training, additional investment and most likely integration with specialty services would be needed to transform these memory clinics into comprehensive outpatient facilities, similar to large oncology practices.

At the other end of the spectrum, limited resources have been concentrated in internationally recognized dementia research centres, such as the Hotchkiss Brain Institute in Calgary, the Djavad Mowafaghian Centre for Brain Health in Vancouver, Sunnybrook in Toronto and the McGill University Health Centre in Montreal. Their participation in clinical trials allowed them to establish care models for a disease-modifying treatment, which could provide blueprints for community practices, much as models for oncology and multiple sclerosis care have diffused from academic medical centres to the community.

In light of the magnitude of the bottlenecks in Canada, creative solutions will be required to make additional resources available by drawing in private funding. Several precedents already exist for this. Provinces have long relied on manufacturers to create and support infusion centres to accommodate the increase in infusions brought about by the spread of biologics for many indications. In theory, such manufacturer-

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CARE MODELS WOULD  
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REFERRALS TO SOCIAL  
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THE MEDICALIZED NATURE  
OF THE TREATMENT.

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INNOVATION  
IN DIAGNOSTIC  
TECHNOLOGY COULD  
ALSO HELP ADDRESS  
CAPACITY CONSTRAINTS.

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supported services could be extended to diagnostic procedures. Quebec allows private facilities to bill patients directly, even for selected covered services, to reduce wait times without additional funding, a policy that could be extended to PET imaging. Alberta reduces the need for investment by contracting services to privately run facilities. Many large hospitals have used charitable donations to acquire imaging equipment but are commonly not permitted to use them for covered services, implying idle capacity.

Innovation in diagnostic technology could also help address capacity constraints. Smaller, mobile and brain-only PET scanners could expand access, particularly in less populated areas. A blood-based biomarker for the Alzheimer's disease pathology in combination with a brief cognitive test would substantially improve the ability of primary care practices to triage patients for further evaluation and thereby decrease demand for cognitive and confirmatory biomarker testing (Mattke et al., 2020).

To summarize, Canada's situation is unique among the G7 countries. While Canada has world-class dementia centres and innovative memory care models, limited capacity for specialist evaluation and biomarker testing will make it difficult to provide these capabilities at scale when a disease-modifying treatment arrives. As we had estimated in an earlier study, these constraints could lead to almost half a million Canadians progressing to manifest dementia while on the wait list for diagnostic work-up (Liu et al., 2019). Although this situation warrants a deeper policy discussion about the future of medical care in Canada, short-term solutions, such as improved diagnostic technologies and increased private sector involvement, should be considered. Both short- and long-term approaches to improving access to memory care touch on politically sensitive topics. A concerted and evidence-driven effort of stakeholders will be needed to start a dialogue and work on solutions, and the national dementia strategy could serve as a hub for those deliberations.

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