

Partnership for Health System Sustainability and Resilience

CANADA

Sustainability and Resilience in the Canadian Health System

Sara Allin, Sierra Campbell, Margaret Jamieson, Fiona Miller, Monika Roerig and John Sproule



November 2022

Authors

Sara Allin, North American Observatory on Health Systems and Policies, Institute of Health Policy, Management and Evaluation, University of Toronto

Sierra Campbell, North American Observatory on Health Systems and Policies, Institute of Health Policy, Management and Evaluation, University of Toronto

Margaret Jamieson, North American Observatory on Health Systems and Policies, Institute of Health Policy, Management and Evaluation, University of Toronto

Fiona Miller, Centre for Sustainable Health Systems, Institute of Health Policy, Management and Evaluation, University of Toronto

Monika Roerig, North American Observatory on Health Systems and Policies, Institute of Health Policy, Management and Evaluation, University of Toronto

John Sproule, Institute of Health Economics

This report was produced as part of the Partnership for Health System Sustainability and Resilience (PHSSR). The PHSSR is a collaboration between AstraZeneca, KPMG, the London School of Economics and Political Science (LSE), Royal Philips, the World Economic Forum, the Center for Asia-Pacific Resilience & Innovation (CAPRI) and the WHO Foundation, motivated by a shared commitment to strengthen health systems and improve population health. AstraZeneca, KPMG and Royal Philips fund the partnership.

This report was written on behalf of the PHSSR. The positions and arguments presented are the authors' own. They do not represent the views of the PHSSR partners listed above.

For further information on the PHSSR, including additional country reports, please visit www.phssr.org

This report was commissioned via LSE Consulting which was set up by The London School of Economics and Political Science to enable and facilitate the application of its academic expertise and intellectual resources.

LSE Enterprise Ltd, trading as LSE Consulting, is a wholly owned subsidiary of the London School of Economics and Political Science. The LSE trademark is used under licence from the London School of Economics and Political Science.

LSE Consulting

LSE Enterprise Ltd
London School of Economics and Political Science
Houghton Street, London, WC2A 2AE

(T) +44 (0)20 7106 1198

(E) consulting@lse.ac.uk

(W) lse.ac.uk/consultancy

Contents



Executive summary	1
1. Introduction	11
2. DOMAIN 1 Governance	13
2.1 Sustainability	14
2.1.1 Regulation and transparency	15
2.1.2 Public participation	16
2.1.3 Public trust	17
2.2 Resilience	18
2.2.1 Preparedness	18
2.2.2 Response to COVID-19	18
2.3 Recommendations	21
3. DOMAIN 2 Financing	22
3.1 Sustainability	23
3.1.1 Raising revenues	24
3.1.2 Progressivity	24
3.2 Resilience	26
3.3 Recommendations	28
4. DOMAIN 3 Workforce	29
4.1 Sustainability	30
4.1.1 Workforce planning	31
4.1.2 Geographic variations in physician supply and staffing	32
4.1.3 Task shifting and scopes of practice	33
4.2 Resilience	34
4.2.1 Consideration of health workers in pandemic plans	34
4.2.2 Workforce policies in response to COVID-19	35
4.2.3 Safety and wellbeing of health workers	36
4.3 Recommendations	37

5. DOMAIN 4 Medicines and technology	38
5.1 Sustainability	39
5.1.1 Adoption of technologies	39
5.1.2 Digital health	41
5.1.3 EMRs	42
5.1.4 Research and development	43
5.2 Resilience	45
5.2.1 Security of supply	45
5.2.2 Vaccination rollout	45
5.2.3 Information systems and digital technologies	46
5.3 Recommendations	46
6. DOMAIN 5 Service delivery	47
6.1 Sustainability	48
6.1.2 Quality and sustainability	49
6.1.2 Primary care and care coordination	50
6.1.3 Persistent inequalities in access to care and an inadequate population health approach	52
6.2 Resilience	52
6.2.1 Maintaining services in a crisis	52
6.3 Recommendations	56
7. DOMAIN 6 Population health and social determinants	57
7.1 Indicators of population health	58
7.2 Strengthening health literacy	62
7.3 Strategies to address structural determinants of health	62
7.4 Recommendations	63
8. DOMAIN 7 Environmental sustainability	64
8.1 Recommendations	66
9. CASE STUDY 1 Long-term care	67
10. CASE STUDY 2 COVID-19 vaccines in Canada	71
11. Acknowledgements	75
12. References	76

Executive summary



Introduction

The Canadian health system has received international recognition for its universal health coverage and financial protection for its residents. However, the health system in Canada continues to face several critically important and longstanding challenges, many of which were exacerbated throughout the COVID-19 pandemic and became crises as of the summer of 2022. This report provides a comprehensive overview of the key issues and strengths across the seven key domains of governance, financing, workforce, medicines and technology, health care delivery, population health, and environmental sustainability, to derive evidence-based recommendations for health sector decision-makers in Canada.

We also describe two case studies: (1) the long-term care (LTC) home crisis and the factors that contributed to the unprecedented mortality rates among residents during the COVID-19 pandemic and (2) the successes and challenges in the rollout of COVID-19 vaccines across Canada.

The report is based on data in addition to dialogue with stakeholders including current and former policy-makers at the federal and provincial/territorial levels, health systems researchers, economists, and physicians (see Acknowledgements) to validate findings from the literature, identify any gaps, and discuss the emerging recommendations.

Findings: key themes regarding sustainability and resilience

The response to the COVID-19 pandemic has emphasized key strengths and underlying issues faced by the health care system in Canada. Table 1 summarizes the key findings for the seven domains.

Table 1: Sustainability and resilience – summary of findings by key domains

DOMAIN 1 GOVERNANCE		
Strengths	<p>Sustainability</p> <ul style="list-style-type: none"> ↑ Mechanisms (e.g., federal/provincial/territorial committees, pan-Canadian health organizations) to support intergovernmental relations (despite sometimes being underused and inefficient) are well established. 	<p>Resilience</p> <ul style="list-style-type: none"> ↑ Some successes have been achieved with the intergovernmental coordination and support for public health leaders across the country, although with inconsistent approaches to transparency of scientific advice for policy.
Weaknesses	<p>Sustainability</p> <ul style="list-style-type: none"> ↓ Engagement of patients, citizens, and workers in key settings in policy formulation and health sector decision-making is inadequate. ↓ A need exists to support the shift towards Indigenous self-governance of health systems to address inequities. ↓ Health and social data to inform policy decisions are fragmented, not readily available for researchers and decision-makers, and variable across the country. 	<p>Resilience</p> <ul style="list-style-type: none"> ↓ Pandemic preparedness plans were generally outdated. ↓ Challenges exist regarding inconsistent communication with the public across levels of government, and the ability to adapt and respond to rapidly evolving evidence.
DOMAIN 2 FINANCING		
Strengths	<p>Sustainability</p> <ul style="list-style-type: none"> ↑ Universal first dollar coverage of hospital and medical care supports financial protection and sustainability. 	<p>Resilience</p> <ul style="list-style-type: none"> ↑ Federal spending power and deficit financing have enabled rapid crisis response across the country.
Weaknesses	<p>Sustainability</p> <ul style="list-style-type: none"> ↓ Gaps in coverage (e.g., in prescription drugs, dental care, mental health, and vision care) contribute to high and variable out-of-pocket expenditures and limit access to, and coordination of, care. ↓ Provider payment methods do not facilitate integration (e.g., they remain provider specific versus team based). 	<p>Resilience</p> <ul style="list-style-type: none"> ↓ Monitoring and evaluation systems, (e.g., to assess and report the health and societal benefits of investments made or policies implemented, are lacking).

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 3 WORKFORCE		
Strengths	<p>Sustainability</p> <ul style="list-style-type: none"> ↑ There has been a steady growth in supply of physicians and nurses in the past decade, and the supply of physicians is about evenly split between specialists and family physicians. 	<p>Resilience</p> <ul style="list-style-type: none"> ↑ Health workers took on new and expanded roles to maintain essential services and respond to surges in demand during acute phases of the pandemic.
Weaknesses	<p>Sustainability</p> <ul style="list-style-type: none"> ↓ Concerns regarding the adequacy of the supply of health providers in Canada are increasing. ↓ A lack of health workforce data, strategies, and projections limit the ability to plan. ↓ Poor distribution of health providers contributes to shortages across Canada, particularly in remote and northern rural areas. ↓ Rigid scopes of practice and province-specific licensing arrangements limit labour mobility. ↓ Inadequate wages, benefits, and job security exist among unregulated care providers, which make up the majority of the elder care workforce. ↓ Inadequate support is available for informal caregivers. 	<p>Resilience</p> <ul style="list-style-type: none"> ↓ Existing vacancies, compounded by a lack of surge capacity, have challenged the pandemic response. ↓ The pandemic has exacerbated mental health challenges and burnout among workers, and a record number of workers are reporting a desire to decrease their working hours or leave their professions. ↓ Health human resources retention and recruitment are in crisis and require immediate attention.

DOMAIN 4 MEDICINES AND TECHNOLOGIES

<p>Strengths</p>	<p>Sustainability</p> <ul style="list-style-type: none"> ↑ Governments have worked together through the Pan-Canadian Pharmaceutical Alliance to reduce pharmaceutical prices. 	<p>Resilience</p> <ul style="list-style-type: none"> ↑ COVID-19 vaccines were rapidly procured, approved, and distributed across the country.
<p>Weaknesses</p>	<p>Sustainability</p> <ul style="list-style-type: none"> ↓ Variable progress in the implementation of interoperable system-wide electronic medical record systems is complicated by limited evaluation of the effects on productivity and outcomes. ↓ Private sector pharmaceutical research and development has declined in recent years and is lower in Canada than most OECD countries. ↓ Prices for brand name and generic drugs are higher in Canada than most other OECD countries. ↓ Access to medical technologies is highly variable across Canada. 	<p>Resilience</p> <ul style="list-style-type: none"> ↓ Processes to develop and implement digital and medical health technologies (e.g., contact tracing/exposure notification technologies) have been redundant and inefficient.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 5 SERVICE DELIVERY		
Strengths	<p>Sustainability</p> <p>↑ Considerable investments have been made in primary care, and there are some promising examples of interprofessional team-based primary care throughout the country.</p>	<p>Resilience</p> <p>↑ A rapid shift towards virtual care options has helped address temporary restrictions during the pandemic.</p>
Weaknesses	<p>Sustainability</p> <p>↓ Limited progress has been made in implementation and scaling of team-based care models; gaps persist in primary and community care back-office and planning infrastructure.</p> <p>↓ Gaps in care for patients with mental health conditions and addiction were exacerbated during the pandemic.</p> <p>↓ Inequitable access and quality of care, along with challenges to more coordinated and managed care for those with chronic conditions, persist.</p> <p>↓ Longstanding underinvestment exists in quality services to support elder care at home or in residential facilities; monitoring of consistent standards is lacking.</p>	<p>Resilience</p> <p>↓ A lack of acute care capacity pre-pandemic (and overreliance on acute care) has required cancellation of routine care and created substantial backlogs.</p> <p>↓ The concentration of COVID-19 deaths in LTC homes has demonstrated the fragility of the sector in response to external shocks, and the challenging situation for workers in these settings.</p>

DOMAIN 6 POPULATION HEALTH AND SOCIAL DETERMINANTS	
Strengths	<p>Sustainability and Resilience</p> <ul style="list-style-type: none"> ↑ Some composite indicators of population health (e.g., average life expectancy) suggest relatively good performance in Canada compared with other OECD countries. ↑ The movement towards more rapid data collection and reporting, and increasing disaggregation, has the potential to support more equity-informed policy action.
Weaknesses	<p>Sustainability and Resilience</p> <ul style="list-style-type: none"> ↓ While some population health indicators are relatively good, progress is stagnating and numerous indicators of social determinants of health indicate that Canada is challenged in many areas. ↓ Disaggregated data are limited, particularly race-based data, although the existing data show persistent inequalities in health. ↓ Numerous reports, declarations, councils, and networks have been established but have made limited progress towards 'health-in-all policies' and addressing the structural causes of inequity. ↓ COVID-19 has exacerbated longstanding health and structural inequities.
DOMAIN 7 ENVIRONMENTAL SUSTAINABILITY	
Strengths	<p>Sustainability and Resilience</p> <ul style="list-style-type: none"> ↑ Efforts to build health system resilience to climate shocks and stresses are underway. ↑ Health Canada's Bureau of Climate Change & Innovation has established expertise in the health impacts of climate change, and supports climate vulnerability and adaptation assessments and resilience planning through various initiatives.
Weaknesses	<p>Sustainability and Resilience</p> <ul style="list-style-type: none"> ↓ Federal and provincial government efforts to decrease carbon emissions from the health sector have been limited. ↓ Existing efforts account for a limited subset of the environmental impacts of the health system, if any; requirements to report and price carbon apply to only the largest health care emitters, except in British Columbia. ↓ Global commitments to include the supply chain in accounting for health care's greenhouse gas emissions will be challenging to implement, owing to data, infrastructure, and human resource limitations, as well as measurement challenges. ↓ Public health expertise and the capacity to address climate health risks are insufficient, yet are more advanced than health care capacity.

Recommendations

Table 2: Recommendations across the seven domains

DOMAIN 1	GOVERNANCE
1A	Strengthen mechanisms for collaborative action across FPT governments, e.g., by undertaking a review of existing networks, committees, and pan-Canadian health organizations to identify opportunities to streamline or consolidate.
1B	Increase the transparency and clarity of the roles of different actors at the FPT levels and across sectors, particularly those associated with public health, and emerging areas outside hospitals and medical care, which require consistent standards.
1C	Prioritize public/citizen engagement in the processes of governance of health systems while still allowing for efficient and responsive decision-making.
1D	Strengthen Indigenous health systems governance, in line with the principle of self-determination.
1E	Increase transparency in decision-making (e.g., through public consultations), public reporting of health system performance (e.g., building on current efforts by CIHI), and mechanisms to solicit scientific advice (e.g., establishing a single institution ensuring streamlined, Canada-wide access to high quality, interdisciplinary expert advice).
1F	Implement a Pan-Canadian Health Data Strategy, considering the recommendations of the Expert Advisory Group.
DOMAIN 2	FINANCING
2A	Ensure tax-based/needs-based financing of health systems.
2B	Move towards filling gaps in coverage (e.g., prescription drugs) and reducing out-of-pocket cost burdens.
2C	Scale up provider payment reforms (e.g., shifts from fee-for-service to capitation) to support integrated, equitable, and cost-effective delivery models.
2D	Expand investment in health innovation to support testing, scaling, and diffusion of promising health service delivery models (e.g., interprofessional team-based care).

Table 2 (continued): Recommendations across the seven domains

DOMAIN 3 WORKFORCE (INCLUDING FOCUS ON SKILLS MIX)	
3A	Strengthen integrated health human resource planning and evaluation with enhanced workforce data infrastructure across occupations, sectors, and jurisdictions, supported by a pan-Canadian agency/body.
3B	Improve working conditions, education standards, and full-time employment with benefits and adequate wages for elder care workers.
3C	Strengthen education pathways for health workers from Indigenous, racialized, and low-income communities to address inequities in the health system.
3D	Move to expanded or full scope of practice to deliver care more efficiently, particularly in primary and community care settings.
3E	Protect the physical and mental wellbeing of health workers with investment in improved working environments and increased access to mental health support services.
DOMAIN 4 MEDICINES AND TECHNOLOGY (INCLUDING FOCUS ON DIGITIZATION OF PRIMARY CARE)	
4A	Support alignment of public drug formularies across the country, such as with a national formulary.
4B	Leverage the pan-Canadian pharmaceutical alliance to strengthen capacity for effective procurement of drugs and technologies.
4C	Strengthen the interoperability, transparency, and linkage of electronic health records.
4D	Strengthen regional, provincial, and national research and development in life sciences and medical technology to support made-in-Canada technological solutions in health care
DOMAIN 5 SERVICE DELIVERY	
5A	Reform primary care to serve as the main access hub for an integrated suite of preventive, diagnostic, treatment, and palliative services in the community.
5B	Scale up innovative strategies and multidisciplinary team-based models of primary care, prioritizing underserved communities and optimizing the available workforce.
5C	Support the implementation of pan-Canadian quality standards throughout the health system, and facilitate the measurement and reporting of performance on a regular basis.
5D	Work with and support Indigenous communities, and take FPT action to address the specific and structural social, economic, and health inequities faced by Indigenous communities.

Table 2 (continued): Recommendations across the seven domains

DOMAIN 6 POPULATION HEALTH AND SOCIAL DETERMINANTS	
6A	Expand the number and scope of national longitudinal surveys to better understand and evaluate interventions aimed at improving health and its determinants.
6B	Meaningfully improve the structural determinants of health, prioritizing early childhood experiences (e.g., eliminating child poverty through targeted cash transfers).
6C	Combat systemic discrimination and racism in the health system, such as by supporting health workforce education and recruitment from racialized populations, and providing widespread access to cultural safety and anti-racism training to all health sector workers (e.g., providers, system managers).
6D	Work with and support Indigenous communities, and take FPT action to address the specific and structural social, economic, and health inequities faced by Indigenous communities.
DOMAIN 7 ENVIRONMENTAL SUSTAINABILITY	
7A	Support efforts to build knowledge, capacity, and networks to spread and scale disparate climate resiliency and sustainability efforts across health systems in Canada, e.g., building on existing networks such as 'Creating a Sustainable Canadian Health System in a Climate Crisis', and the 'Canadian Coalition for Green Health Care'.
7B	Produce and publicly report consistent, robust, and actionable baseline data across the country on the environmental impacts of health systems.

1. Introduction



Canada's health systems are at the forefront of public and political discourse in this third year of the COVID-19 global pandemic. This report provides a comprehensive overview of the key issues and strengths to support decision-makers in their efforts to review, rebuild, and reform health systems to improve both long-term sustainability and resilience to future shocks.

Table 3: Definitions of health system sustainability and governance underpinning the analysis

<p>Health system sustainability</p>	<p>A health system's ability to improve population health, by continually delivering the key functions of providing services, generating resources, financing and stewardship, incorporating principles of financial fairness, equity in access, responsiveness and efficiency of care, and to do so in an environmentally sustainable manner.</p>
<p>Health system resilience</p>	<p>A health system's ability to prepare for, absorb, adapt to, learn, transform and recover from crises born of short-term shocks and accumulated stresses, in order to minimise their negative impact on population health and disruption caused to health services.</p>

The report includes a non-exhaustive set of focused recommendations aimed at being suitable for rapid implementation. It does not address more fundamental shifts in policy beyond the health system that may be required to address important and enduring issues, such as persistent health inequities. In addition, it does not provide detailed contextualized recommendations for each province and territory (PT), but instead provides a set of policy options for federal, provincial, and territorial (FPT) governments to consider adapting and implementing in their jurisdictions. Further work and mechanisms to ensuring learning from the pandemic are paramount. Nonetheless, the recommendations contribute to the debate regarding which actions are necessary to ensure the sustainability and resilience of the health and care system to future shocks.

2. DOMAIN 1

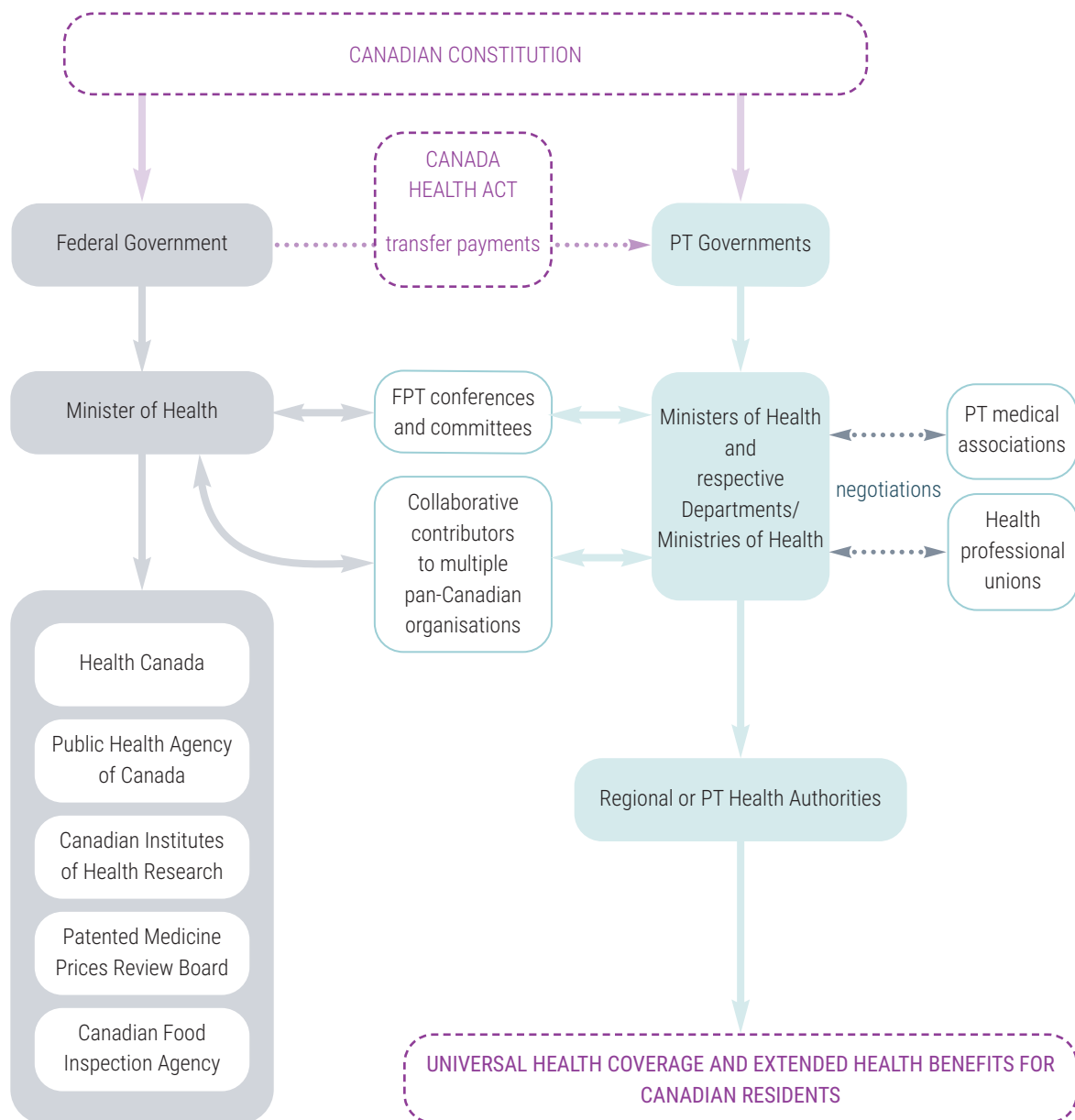
Governance



2.1 Sustainability

Canada is a highly decentralized federation with authorities, roles, and responsibilities held by FPT governments [1]. The federal government undertakes a stewardship role in health care, including by establishing and administering national principles under the *Canada Health Act*, 1984 [2]. These principles include universality and accessibility, and they apply to a narrow set of services, principally hospital and physician/medical care. The federal government also provides financial support to PTs, including cash transfers to the PTs in support of health through the Canada Health Transfer, and direct funding or provision of services for some populations (e.g., First Nations and Inuit Peoples). The key actors in health system governance are shown in Figure 1.

Figure 1. Overview of the Canadian Health System



Source: [2]

At the federal level, Health Canada regulates the safety and efficacy of medical technologies (e.g., medicines and devices). The Canadian Institutes of Health Research comprise 13 institutes that provide funding for health research. The Public Health Agency of Canada (PHAC) provides national public health leadership and serves as Canada's national contact point for the WHO on International Health Regulations matters [2,3]. The PT governments administer health care for their residents. They have largely delegated the oversight of health and LTC (although not physician budgets or prescription drug programs) to 'arm's-length' province-wide or regional health authorities.

A dense network of intergovernmental relations (IGR), including both vertical and horizontal, allow for some coordination of governance in Canada's highly decentralized federation. Vertical IGR constitutes the relationship between constituent units and the centre, whereas horizontal IGR involves relations among the constituent units [3,4]. IGR are not anchored in the constitution but provide the scope to evolve through changing political dynamics, to provide direction for strategic policy and communications, coordination of activities with other ministries, and liaison among jurisdictions [4]. The First Ministers conferences, often regarded as the apex of vertical IGR, unite Canada's FPT First Ministers for discussion; these FPT conferences also convene leaders at other levels of authority, including deputy ministers [4]. The other instruments/mechanisms available are FPT advisory councils, committees, working groups, and agencies that report to the Conference of FPT Deputy Ministers of Health, which in turn reports to the Conference of FPT Ministers of Health. PT governments also collaborate through the Council of the Federation (of the 13 PTs) [2]. This group consists of all 13 premiers (but not the Prime Minister). It met in July 2022 and discussed topics including the need to advocate for additional funds from the federal government to support provincial and territorial health systems.

Strengthening the governance of health care for Indigenous populations and addressing legislative uncertainty, fragmentation, and conflicting roles among FPT governments and Indigenous authorities are increasingly recognized as priorities in Canada. Moving towards Indigenous self-determination is recognized as a critical step in addressing historical and ongoing inequities in health and access to care among Indigenous peoples [5]. In 2021, the federal government launched a process of engagement with Indigenous partners and PT governments to develop new legislation that acknowledges the distinct cultures and needs of First Nations, Inuit, and Métis Peoples.

Seven specialized pan-Canadian health organizations provide further opportunities for FPT government collaboration. These organizations work on progressing pan-Canadian priorities and federal objectives on specific issues such as standardizing and reporting on health care data and health system performance, and supporting quality improvement among health organizations and system leaders across the country [6]. Accreditation for health and social care organizations is voluntary in Canada, but most health and social service provider organizations are accredited by Accreditation Canada, a national NGO that conducts reviews, and provides recommendations and measures for quality improvement [2]. Although multiple mechanisms for vertical and horizontal IGR support coordinated governance in Canada, concerns persist regarding these mechanisms, thus contributing to confusion regarding areas of responsibility. Further clarity regarding how to resolve disputes about roles and responsibilities may be needed.

2.1.1 Regulation and transparency

Because PT governments have the primary responsibility of administering and delivering publicly funded health services for their residents, they are also responsible for regulating health providers. PT governments also, to varying extents, delegate authority for contracting and/or delivering health care and LTC to regional or provincial, arm's-length health authorities. The professional regulation approach varies across PTs. A combination of three approaches is used: licensure (providing health professionals exclusive rights to provide a particular service), certification (granting health professionals to provide services), and controlled act provision to regulate specific tasks or activities

[2]. *The Canada Health Act* identifies the general types of health services that should be universally provided (principally hospital, and physician/medical care), but coverage for health care products and services is at the discretion of PTs.

Health technology assessment (HTA) organizations operate at the provincial and pan-Canadian levels. At the pan-Canadian level, the Canadian Agency for Drugs and Technologies in Health (CADTH) conducts evaluations of outpatient pharmaceuticals, cancer therapies, and other new technologies for most PT health systems (excluding Quebec), and provides recommendations on whether to introduce or support these new technologies into their health coverage programs. PT governments use CADTH evidence reviews and recommendations, as well as information from their own HTA agencies or review processes to inform coverage decisions. Quebec, Ontario, Alberta, and British Columbia all have their own programs for conducting HTAs.

One mechanism to strengthen public transparency and accountability regarding the operation of PT universal health coverage programs (collectively referred to as Medicare) is the annual report to the federal parliament on the administration and operation of the *Canada Health Act*. This report includes information on PT health plans and any violations of the criteria for federal transfers under the Act [7]. Each PT is also responsible for reporting on their health system performance. Moreover, whereas hospital and physician/medical services are fairly consistently provided across the PTs, variations exist in the services falling outside the universality and other conditions of the Canada Health Act, such as LTC (including residential and home care), mental health services, prescription drugs, and vision care. Canada-wide reporting of these variations and their effects on health is limited. A federal government-commissioned review of the pan-Canadian health organizations identified a need for a mechanism for reviewing and updating the list of publicly insured services, partly to address these variations in coverage across the country, but also to strengthen the transparency of decision-making around adding (or defunding) publicly financed services [8].

In the context of multiple competing priorities for improving the sustainability and resilience of the system, the FPT governments may benefit from consolidated (i.e., pan-Canadian) guidance on prioritizing short-term and long-term goals and initiatives. Such guidance has been provided in Royal Commissions, which are appointed by the federal government to address issues of national importance, although the most recent was more than two decades ago, in 2002. Although Royal Commissions may help ensure some degree of transparency in the governance of health systems, the more routine reports of the Auditor General of Canada and the provincial counterparts are primarily focused on determining the dollars spent, rather than assessing or providing advice regarding improving the value of these expenditures.

2.1.2 Public participation

Public participation is increasingly recognized as an important area for strengthening the health system in Canada; however, the mechanisms to do so have been largely limited to regional bodies (e.g., health authorities) or local levels (e.g., hospitals), with an emphasis on patient and family engagement rather than citizen or community engagement [9]. However, all PTs have introduced some formal mechanisms to engage patients and families in decision-making and health system governance, including forming family and community advisory councils and specific provincial initiatives. For example, the 2010 *Excellent Care for All Act* in Ontario mandates public consultation and patient surveys; more recently, one of the requirements for Ontario Health Teams implementation, which began in 2018, is to “meaningfully engage” with patients, families, and communities, and to develop a *Patient, Family and Caregiver Partnership and Engagement Strategy* [10]. In Quebec, extensive public consultations occurred regarding end-of-life care and medical assistance in dying. This effort was led by a government special committee and took the form of a public survey and a series of televised hearings in the summer of 2021 to determine how existing legislation could be modified to be made more inclusive [11]. Although these initiatives reflect the goal of enhancing public engagement and participation and inclusive decision-making, wide

variations exist in the opportunities for members of the public to be involved in decision-making, the diversity in representation, and the challenges in gaining access to the information needed to hold decision-makers accountable.

Similarly, public and community engagement in public health systems – that is, the actors primarily involved in delivering public health programs and services – is a gap in Canada. The recent supplementary report for the Chief Public Health Officer of Canada on the State of Public Health in Canada 2021 suggests that engaging the community in public health systems is critical to ensure collective responsibility and must centre on the bottom-up needs of the community. The report identifies this aspect as a challenge and recommends suggestions for mechanisms to be in place to link the community to the various jurisdictional levels of the public health system (e.g., municipal, regional, provincial/territorial, federal, and international). Enabling such mechanisms would require facilitating public dialogue, ensuring the presence of community voices and representation in decision-making, and supporting community movements [12].

2.1.3 Public trust

Public trust in governments and health system performance is reported by a variety of organizations, such as the OECD [13], Edelman [14,15], and Ipsos [16], and internally by Statistics Canada [17]. Among Canadians, trust in the national government is generally higher than that in other countries, although it has declined since the start of the COVID-19 pandemic. As of 2021, Canada has been reported to have higher-than-average positive responses to questions about trust in government: approximately 45% of respondents indicated that they trust their national government, as compared with the OECD average of 41%. Within Canada, the western provinces of Alberta, Saskatchewan, and Manitoba had the lowest rates of trust (approximately 35%), whereas Quebec had the highest (approximately 55%) [13]. When asked about the government's ability to protect people in the event of another pandemic-like event, most Canadians believed that it was likely (53%), with the average levels in the OECD were modestly lower (49%). That report has also indicated marginally lower satisfaction with the health care system in Canada (61% satisfied) than the OECD average (62%). However, according to the Ipsos Global Health Monitor 2021, levels of trust in the health care system to provide the best treatment were higher in Canada (59%) than the 30-country average (51%) [16].

Within Canada, variation also exists in levels of trust, particularly in response to the COVID-19 pandemic. A poll conducted by Leger has reinforced findings of high trust in government decision-making regarding public health orders, but has also identified significant erosion of trust in government bodies and public health decision-makers during the pandemic [18]. Among the surveyed individuals, respondents from Quebec reported the lowest levels of trust erosion in the national government (18%), whereas those in Alberta reported the highest levels (40%). Typically, levels of trust in national and provincial governments, national and provincial public health bodies, and the health care system in general eroded the most in Alberta, as compared with the rest of Canada [18]. In 2020, Statistics Canada released findings from a crowdsourced survey on trust in government, public health authorities, businesses, and others during the COVID-19 pandemic. From these data, between 55% and 62% of respondents reported having high levels of trust in FPT and municipal governments in making good decisions regarding when and how to reopen workplaces and public spaces [17]. These recent data sources on public trust have indicated distinct variations within Canada, both across PTs and within population groups (according to gender, age, and immigration status). Routine measurement of trust in health and government institutions would enable monitoring of changes over time [17].

2.2 Resilience

2.2.1 Preparedness

Public health is a shared responsibility of the federal and PT (and to some extent municipal) governments. At the federal level, the prevention and control of infectious diseases and preparation, and the response to public health emergencies lie with PHAC. PHAC was established in 2004 to enhance Canada's public health systems' capacity to respond to emerging public health threats, and its leadership includes the Chief Public Health Officer. The need for a federal agency to provide leadership in public health issues and improve collaboration across jurisdictions was a recommendation in the 2003 Report of the National Advisory Committee on SARS and Public Health chaired by David Naylor [19].

Although PHAC is a federal government agency that provides leadership on public health issues for the country, the main mechanism to support collaboration in public health across governments is the Pan-Canadian Public Health Network. The Chief Public Health Officer of Canada is co-chair of the network, and all FPT authorities are engaged as equal partners; it comprises health sector and public health leaders across the country (including all chief medical/public health officers of health for federal and PT governments) [20].

The overarching goal of the pandemic response, according to the *Federal, Provincial, Territorial Public Health Response Plan for Ongoing Management of COVID-19*, has been to "minimize serious illness and overall deaths while minimizing societal disruption as a result of the COVID-19 pandemic" [21]. The plan incorporates a requirement for ongoing revision, and development of an event-specific implementation plan [22]. As of July 2022, the Plan had been updated three times; the third edition was published in March 2022, with a focus on the longer-term response to the ongoing presence of COVID-19 "in the context of increased population immunity and other public health priorities" – representing a shift from earlier plans that focused on managing the acute phases of the pandemic [21]. As outlined in the Plan, the Public Health Network has several responsibilities during public health emergencies, namely establishing relevant technical and strategic committees to provide consolidated advice to PT health leaders (specifically deputy ministers of health, the most senior bureaucrats in the health sector) in the pandemic response [23].

The 2021 Report of the Auditor General of Canada to the Parliament of Canada highlights several limitations and few strengths in pandemic preparedness in Canada [24]. First, PHAC was not adequately prepared to respond to the pandemic, and it underestimated the potential effects of the virus at the onset of the pandemic. Second, the agency was not as well prepared as it could have been, because it had not resolved long-standing issues in health surveillance information, including shortcomings that impeded the effective exchange in health data between the agency and the PTs. Third, PHAC did not regularly update or test all plans for a national health response to a pandemic, particularly one of such magnitude as the COVID-19 pandemic. Finally, outdated information technology infrastructure issues, and a lack of data sharing agreements, impeded its ability to inform FPT government responses. The same audit also indicated a strength in the 'whole-government' approach implemented at the start of the pandemic. This approach was led by an Incident Response Group, a group of federal ministers convened by the Prime Minister in national crises [25].

2.2.2 Response to COVID-19

The suite of public health and economic measures taken in Canada in response to the pandemic are similar to those seen elsewhere, including state of emergency declarations (at the PT but not national level), border closures (both international borders and to some extent also domestic), physical distancing guidelines, movement and gathering restrictions, school and workplace closures, mask mandates, and substantial economics supports for individuals and businesses

[26,27]. The COVID-19 response was supported by significantly increased funding to the health care system and other sectors (see Domain 2: Financing).

Compared with 10 other high-income countries, data on a range of epidemiological and policy indicators suggest that in the first 2 years of the pandemic, Canada performed well in some indicators but poorly in others [28]. For example, Canada performed comparatively well in terms of achieving relatively lower rates of COVID-19 and excess mortality, and mitigating severe economic impacts (as indicated by comparable growth in inflation and public debt). However, Canada faced more sustained public health measures, such as school closures [28], which can increase inequalities in educational outcomes [29,30]. Compared with the other 10 countries, Canada also achieved a high rate of vaccination [28]. More than 80% of eligible individuals 5 years of age or older had received at least one dose, and nearly 80% had received at least two doses within a year after the initiation of COVID-19 vaccine administration (see Domain 4: Medicines and Technology). The burden of SARS-CoV-2 infections and deaths was borne primarily by low income, racialized, migrant, and LTC resident populations, thereby exacerbating the already substantial inequalities in Canadian society [31–34]. In addition, notable geographic variations existed in the pandemic responses across the country; for example, stricter limits were placed on domestic travel in the four provinces on the Atlantic coast (Newfoundland and Labrador, Nova Scotia, New Brunswick, and Prince Edward Island) than in the rest of the country.

The effectiveness of the COVID-19 response at the federal level has been the focus of several reviews and inquiries. A rapid review was conducted in April 2022 to summarize knowledge regarding the Public Health Network, in terms of how it had supported the pandemic response in Canada [35]. The rapid review identified a strength of the pandemic response in the strong inter-jurisdictional coordination and relatively consistent messaging early in the pandemic from the top public health officials across the country [35]. However, several weaknesses were indicated. One gap related to the engagement of people with lived experiences of structural inequities, such as those from Indigenous, racialized, or low income communities [35]. Another gap involved inadequate engagement of health care workers, which might have contributed to inadequate access to personal protective equipment (PPE; see Domain 3: Workforce). Thus, striking the ideal balance between the need to ensure adequate public and citizen engagement in decision-making, and the need to make decisions quickly and respond to rapidly changing information and evidence was challenging.

Other reviews have been led by researchers and provider networks and associations, including the Canadian Public Health Association and the Public Health Physicians of Canada. Some key gaps were highlighted, such as aspects of the data and information infrastructure in Canada that hindered effective surveillance, and inequitable impacts and equity-guided responses. Other gaps included a need to clarify the roles and responsibilities of federal and PT officials in a public health emergency, and to augment the financial and human resources in public health systems [36–38].

At the PT level, reviews and inquiries of various aspects of the pandemic responses are ongoing. For example, provincial inquiries and reviews of LTC were also conducted to examine the contributors to the devastating effects of COVID-19 in LTC homes in Ontario [39] and in Quebec, and to assess the effectiveness of the COVID-19 response regarding care and services for older people [40]. The major systemic vulnerabilities identified in Quebec echoed the findings of the Ontario commission. These vulnerabilities included the lack of preparedness to manage the health system in a crisis, and sustained underinvestment and inattention to the health and safety of workers in care homes. Furthermore, the inquiry in Quebec revealed deficiencies in the governance of the LTC/elder care sector specifically, and the health system as a whole, such as a focus on production volumes, access, and cost control, instead of on care quality and individual health. Policy researchers indicated key challenges associated with an inability to make rapid infrastructural changes; insufficient hiring or testing capacity to limit school closures; and the ineffective use of technology, for example, delayed development and unsuccessful adoption of apps [41].

Moreover, emerging evidence documents successful Indigenous community-led COVID-19 pandemic responses aligned with principles of self-determination. For example, in Alberta, two Indigenous communities – the Siksika Nation and Metis Nation of Alberta – followed an integrated approach governing the pandemic response, prioritizing not only public health but also ongoing access to social supports, including financial, cultural, and housing needs [42]. The authors of the study concluded by stating the importance of incorporating Indigenous culture and following the principle of self-determination in an effective pandemic response. Some of these themes were also indicated in a companion report to the 2020 annual report of the Chief Public Health Officer of Canada, which provides directions and discusses challenges faced by Indigenous leaders and communities in the first year of the pandemic [43]. These directions included the need for the federal government to commit to meaningful distinctions-based community engagement of Indigenous peoples – i.e., recognizing the different cultures, languages, and traditions among groups – and to mandate cultural safety training for public servants across all levels of government.

Science advisory mechanisms and transparency

The complex and quickly evolving pandemic necessitated rapid, independent, and trustworthy science advice to inform policy decisions. The Chief Science Advisor's office instituted national and international initiatives (e.g. CanCOVID), as well as expert panels and task forces in areas such as health systems, data modelling, LTC, and COVID-19 in children, to provide advice and guidance on the latest scientific developments [44]. The federal government also provided substantial funding dedicated to health research. Overall, the mobilization of science advice during the pandemic at the federal level was characterized by a proliferation of advisory bodies with unclear coordination and time-limited mandates [45]. Horizontal coordination of science advice in public health is limited, and is fragmented across the different health and science portfolios. This fragmentation has led some researchers to call for a new federal agency for science advice for health emergencies, to coordinate the mobilization and consolidation of science advice across federal departments [46].

Transparency was also limited regarding public communication. Effective and clear public communication was challenged by the proliferation of information sources, such as on social media and the evolving evidence base, along with decreasing levels of public trust in government and science. These challenges raise questions regarding how public officials can strengthen and modernize communication strategies, such as with social media, to directly engage the public in discussion and debate regarding risks, uncertainty, trade-offs, and principles underlying decisions.

Data infrastructure and governance

A consistent challenge to effective governance before and during the pandemic has been the underdeveloped and fragmented health data infrastructure (see Domain 4: Medicines and Technology section). One promising initiative to advance the health data infrastructure in Canada is the pan-Canadian Health Data Strategy (the Strategy), which aims to support the effective creation, exchange, and use of critical health data for the benefit of Canadians and the health and public health systems on which they rely. The Strategy is expected to support Canada's response to COVID-19 by addressing immediate health data challenges during the COVID-19 pandemic. In the longer term, it will focus on establishing a common foundation for improving Canada's ability to collect, protect, and use health data, to inform health care and public health system adaptation, improve processes for data sharing, and help Canada prevent and respond to future health threats. Importantly, the PTs vary in their data infrastructure capacity and approach to data governance, both of which new strategies will need to account for and build on. Moreover, concerns regarding data privacy and patient consent for data sharing must be considered to maintain public trust.

An Expert Advisory Group (EAG) for the pan-Canadian data strategy was established in fall 2020 to support the collection, protection, and use of health data. The lack of clear data governance (i.e., how data are created, collected, shared, and managed) was identified as a current gap in the system. Attempts to establish data governance have been too broad (e.g., creating a blueprint lacking a use and implementation strategy) or too focused on local needs, without a vision for

integration and scaling up of innovation [47]. The EAG has also suggested the need to build trust and engage individuals and communities to express their requirements, hopes, and concerns regarding health data, and to translate them into policies, processes, and practices [47]. The EAG has, to date, published three reports and made concrete recommendations to address the longstanding challenges in health data in Canada [48].

2.3 Recommendations

RECOMMENDATION 1A

Strengthen mechanisms for collaborative action across FPT governments, e.g., by undertaking a review of existing networks, committees, and pan-Canadian health organizations to identify opportunities to streamline or consolidate.

RECOMMENDATION 1B

Increase the transparency and clarity of the roles of different actors at the FPT levels and across sectors, particularly those associated with public health, and emerging areas outside hospitals and medical care, all of which require consistent standards.

RECOMMENDATION 1C

Prioritize public/citizen engagement in the processes of governance of health systems while still allowing for efficient and responsive decision-making.

RECOMMENDATION 1D

Strengthen Indigenous health systems governance, in line with the principle of self-determination.

RECOMMENDATION 1E

Increase transparency in: decision-making (e.g., through public consultations), public reporting of health system performance (e.g., building on current efforts by CIHI), and mechanisms to solicit scientific advice (e.g., establishing a single institution ensuring streamlined, Canada-wide access to high quality, interdisciplinary expert advice).

RECOMMENDATION 1F

Implement a Pan-Canadian Health Data Strategy, considering the recommendations of the Expert Advisory Group.

3. DOMAIN 2
Financing



3.1 Sustainability

For several years, health expenditure has grown at a level comparable to or greater than the growth of the Canadian economy. The COVID-19 pandemic has fuelled the sharpest spending increase in a single year. Between 2019 to 2020, total expenditures increased by approximately 13%. Owing to the increased spending combined with a decline in economic activity in 2020, the level of spending as a proportion of GDP reached an all-time high of 13.7% in 2020, then fell slightly to 12.7% in 2021 as the economy gradually recovered (Table 4). Indeed, after a sharp increase in unemployment with the pandemic in 2020, by 2021, unemployment rates returned to pre-pandemic levels. Health system budgets make up the single largest portion of PT budgets in Canada, averaging approximately 40%.

Table 4: Health system spending and financing

	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Health care spending as a proportion of GDP ^a	11.4%	11.2%	11.0%	11.5%	11.7%	11.5%	11.5%	11.6%	13.7%	12.7%
Proportion of public sources of funding ^a	70.9%	71.2%	71.0%	70.9%	69.9%	70.0%	70.2%	70.1%	75.1%	74.7%

Source: a [49]

* Forecasted

The pandemic has also shifted the public-private combination of financing. With a sharp increase in public spending on health care with the pandemic, the 70%/30% combination in public-private finance, which has been highly stable for more than two decades, shifted to 75%/25%. Notably, federal government spending on health care was the main driver of the public spending increase between 2019 and 2020 (Table 5). Although spending on health care directly by the federal government (beyond the transfers to the PTs) has been below 4% of total health expenditures since the start of health expenditure data reporting (in 1975), pandemic-associated health care spending by the federal government increased this proportion to above 8% in 2020 and to 7.5% in 2021. Provincial governments also increased spending in response to the pandemic, thus leading to a marginal increase in the proportion of spending from PT governments, from 64.7% in 2019 to 65.6% in 2021. These trends correspond to substantial increases in long-term debt at the federal and PT levels. For example, in Ontario, the net debt-to-GDP ratio increased from 39.7% in 2019–2020 to 48.5% in 2021–2022 and is projected to be 49.6% in 2022–2023 [50]. The federal government projected net debt was 47.6% of the GDP in 2021, compared with 42.7% of the GDP in 2020 and 29.8% in 2019 [51,52]. Notably these percentages are lower than those in most other OECD countries and are sustainable according to the Parliamentary Budget Officer [53].

Table 5: Public and private sources of health care funding

Proportion of funding from:	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
PT governments	65.6%	66.0%	65.8%	65.8%	64.8%	64.8%	64.8%	64.7%	65.2%	65.6%
Social security funds	1.3%	1.4%	1.4%	1.3%	1.3%	1.3%	1.4%	1.4%	1.2%	1.2%
Federal government (direct)	3.5%	3.4%	3.4%	3.2%	3.3%	3.5%	3.6%	3.7%	8.2%	7.5%
Private sector	29.1%	28.8%	29.0%	29.1%	30.1%	30.0%	29.8%	29.9%	24.9%	25.3%
Out-of-pocket spending	14.9%	14.5%	14.6%	14.6%	15.5%	15.3%	15.0%	14.9%	ND	ND

Source: [49]

Note: Federal government (direct) spending does not include transfers to the PTs

3.1.1 Raising revenues

PT governments are responsible for raising revenue and paying providers. Financing decisions are made at the PT level, and the federal government plays a role in setting the level of federal cash transfers. The federal government contributes, through cash transfers in the Canada Health Transfer, less than one-quarter of PT health expenditures – a share that has steadily declined since the start of universal health coverage in the 1960s. The Canada Health Transfer, as of 2017, was set to increase over time, with a minimum increase of at least 3% per year or in line with the GDP. The total amount transferred to PTs is based on population size [54]. In addition to cash transfers as part of the Canada Health Transfer that are associated with the conditions articulated in the *Canada Health Act*, the federal government has also negotiated conditional cash transfers through bilateral agreements with each PT government to support specific health system goals (recently, a total of \$11.7 billion in support of expanded access to mental health and home care). Close examination the health system performance impacts of these investments on home, community, and mental health sectors will be important.

At the request of the Council of the Federation, an inter-governmental body made up of all PT premiers, the Conference Board of Canada, conducted a study to project future health expenditures [55]. The Conference Board, an independent think tank, projected an average annual growth rate of health expenditures of 5.4% between 2019–2020 and 2030–2031. The premiers used findings from this study to argue for increased federal government funding through the Canada Health Transfer, from 22% to 35% of total PT health expenditures [56]. Further review of the Canada Health Transfer may be needed to ensure that the health system is adequately funded.

3.1.2 Progressivity

The reliance on general tax revenues to finance health care hinders precise estimation of the progressivity of health financing specifically, because of the combination of progressive mechanisms (income taxes from individuals and corporations) with more regressive sources (e.g., consumption taxes). At the federal level, nearly 50% of general revenues are from income taxes, and approximately 16% are from sales taxes; at the PT level, these estimates are approximately 30% and 25%, respectively, and are substantially less progressive (on the basis of data from 2018). The financing of non-Medicare services (notably dental care, vision care, and approximately 50% of prescription drugs out of hospital) is regressive, given the reliance on out-of-pocket payments and private insurance [57,58]. Finally, the role of private insurance in the Canadian health system is likely to be a regressive mechanism of financing, partly because of the substantial tax expenditures associated with the federal and provincial (except in Quebec) governments' exemption of private health insurance premiums from income taxes that disproportionately benefit higher income earners [59].

Health expenditure is divided into several parts, the largest comprising hospitals, physicians, and drugs. The broad approach to defining the basket of services included in Canada's universal health coverage program has been criticized on the grounds that no effort is made to evaluate relative costs and benefits (CIHI, 2021), and the process lacks transparency. Table 6 summarizes the total spending among major categories of care by physicians in primary and specialist settings, as well as home and community care, and public health.

1. Statistics Canada table 3610045001-eng-1

Table 6: Total health care spending, stratified by spending category and percentage of total (2021/22, forecast)

Spending category	CAD billion	% of total
Total physician spending	41.5	13.5%
Home and community care spending (provincial and territorial government)	11.2	3.6%
Total public health spending (not including COVID-19 spending)	16.4	5.3%
Total hospital spending	77.4	25.1%
Total drug spending	42.8	13.9%
Total spending on other institutions ^a	34.2	11.1%
Total other spending (includes other professionals, administration and remaining other spending)	61.8	20.1%
Total COVID-19 response funding	22.8	7.4%

a Includes LTC home spending, alongside other residential facilities, such as facilities for people with alcohol and drug use, developmental or physical disabilities, and other facilities.

Source: [49]

The allocation of health sector dollars varies across provinces, although all sectors experienced slowed growth in spending in the past decade. Public health sectors in Quebec and Nova Scotia were particularly vulnerable entering into the COVID-19 pandemic. From 1979 to 2018, health expenditure for pharmaceuticals saw the largest increase (15 times) followed by public health (five times) [61].

Gaps in coverage and out-of-pocket spending

The health systems in Canada provide considerable financial protection: 3% of Canadians have been estimated to spend more than one-tenth of their disposable income on health care; however, among the lowest income group, this percentage increases to 8% (compared with 1% of those in the highest income quintile) [World Bank 2018, as cited by 2]. Major gaps exist in universal coverage in Canada, owing to the narrow definition of medically necessary services, and the varied approaches used by PTs to subsidize services beyond hospitals and physician care. These gaps include prescription drugs outside of hospitals, dental care, and outpatient medical and assistive devices; LTC in residential facilities and in the home; vision care; and community mental health and addictions services.

Resource allocation and provider payment

Risk equalization measures are scarcely used to allocate resources from federal to PT governments or within PT health systems to sub-provincial regional bodies. For instance, population needs are not considered in the formula used to allocate health transfer payments from the federal government to PTs, because these are based on population size. In the six provinces with sub-provincial health regions/authorities, the allocation of health budgets is based primarily on historical spending patterns vs. any estimates of population need.

PT governments have taken a passive approach to funding health care since the establishment of their single-payer health systems. Limited effort has been made to move from this passive approach to more strategic approaches that consider outcomes or quality in the payment models. Most provinces continue to pay hospitals through global budgets (i.e., a fixed amount for operating costs in a given year, defined largely on the basis of historical expenditures). Although some advantages

exist with budgets, specifically that they are effective methods of cost containment by fuelling declines in average length of stay and increases in occupancy rates over time; however, these cost containment gains might have come at the expense of lengthy wait times and quality of care.

Most provinces also continue to pay for specialist physicians with fee-for-service payments. Although a shift away from fee-for-service towards capitation and other alternative payment models has occurred for family physicians, this shift remains the exception and is limited to few provinces (e.g., Ontario and Nova Scotia). A major critique of the current funding models is not only the limited incentives to improve quality and patient-centred care, but also the siloed or sector-specific funding policies that perpetuate fragmented and poorly coordinated care across sectors (see Domain 5: Service delivery) [62]. The experimentation with bundled payments (i.e., paying for episodes of care that span multiple providers for particular conditions with clear care pathways) in Ontario presents an opportunity that could be adapted and used across the country [62]. Moreover, the shift in primary care physician payment models towards capitation in some provinces could also be leveraged and adapted elsewhere. This shift could also work to address some shortcomings of the current models, such as the lack of risk adjustment in the capitation formula, and continued physician-based funding models that may adequately support physician group practice but not inter-professional teams. Moreover, payment reforms could also consider moving away from provider-specific models towards networks and teams to support coordinated care across the continuum.

3.2 Resilience

A significant increase in funding was made available to the health system to support crisis response and management during the COVID-19 pandemic. Table 7 describes the main COVID-19 related expenditures by the federal government. Overall, estimates by the Canadian Centre for Policy Alternatives show that the federal government covered 86% of all net new COVID-19 costs (including both health and social protection measures), and the PTs contributed the other 14% as of spring 2021 [63]. This report also compared expenditures across provinces. British Columbia and Quebec spent the largest share of GDP (3.5% and 3.3%, respectively) on the COVID-19 response, as compared with 2.6% in Ontario and less than 1.5% in the Atlantic provinces and Alberta. Health care spending is the third largest category of COVID-19 related expenses, although income supports for

Table 7: Selected expenditures associated with the COVID-19 response (CAD million)

Spending category	June 2020 to March 2021	April 2021 to November 2021
COVID-19 response fund	430.5	95.4
Funding for personal protective equipment and supplies	1802.4	0.0
Immediate public health response	12.5	0.0
Indigenous public health investment	387.4	190.0
Investments in LTC and other supportive care facilities	4.7	81.1
PPE and related equipment support for essential workers	254.2	62.2
Support for COVID-19 medical research and vaccine developments	239.3	92.0

Note: The values in this table were drawn from the most recent months available in spreadsheets. They reflect the value equivalent to the year to date value, summed across all agencies contributing to the specific fund.

Source: [64]

businesses and individuals were five times larger than health care costs. Among health care related costs, 71% of new COVID-associated spending was from the federal government, and 29% was from PTs. In terms of total health spending in 2021, COVID-19 related spending represented 7% of total FPT spending, which was applied to medical goods (31%), treatment costs (30%), vaccination (27%), testing and contact tracing (10%), and other expenditures (1%) [49].

Separate related aspects of health system economic sustainability include the overall prices of consumer goods, and health and personal care goods, as well as the degree to which health system wages are keeping pace with inflation. Aside from being a major input into macro-level economic decisions, such as the interest rate, the overall price of consumer goods as well as health and personal care goods dictates how much of these goods consumers – who are also health system patients – can afford on their wages. An increase in the price of healthier food options, or health-relevant items such as toothpaste, could make them more unaffordable for some individuals, depending on the price increase. Over the long term, increases in the prices of these goods without a corresponding increase in wages may increase the burden on the health system if patients are unable to access healthful consumption choices. Although wage growth in all industries (3.67% between Q1 2019 and Q1 2020) initially outpaced inflation (1.81% between Q1 2019 and Q1 2020) in the first year of the COVID-19 pandemic, inflation over the past year is now twice the rate of wage growth over the same time period (5.83% compared with 2.54%). This increase has been even larger for inflation in health and personal care items (6.72% between Q1 2021 and Q1 2022) [65,66] (Table 8).

Similarly to wages in all industries, the percentage change in health care and social assistance wages has been relatively stable over the past few years. Therefore, concerns have been raised regarding the purchasing power of wages earned by health care and social sector workers in times of high inflation. However, how long the high inflation rates will last in Canada is unknown, and whether health care providers and institutions may require a short-term or longer-term adjustment in wages/budgets remains to be seen.

Table 8: Increase in prices of certain consumer goods and wages over the past 3 years

Percentage change in...	Q1 2019–2020	Q1 2020–2021	Q1 2021–2022
CPI (all items)	1.81%	1.44%	5.83%
Health and personal care	2.64%	1.50%	6.72%
Wages (total, all industries)	3.67%	4.42%	2.54%
Wages (health care and social assistance)	2.33%	3.52%	2.40%

CPI = consumer price index

Sources: [65,66]

3.3 Recommendations

RECOMMENDATION 2A

Ensure tax-based/needs-based financing of health systems.

RECOMMENDATION 2B

Move towards filling gaps in coverage (e.g., prescription drugs) and reducing out-of-pocket cost burden.

RECOMMENDATION 2C

Scale up provider payment reform (e.g., shift from fee-for-service to capitation) to support integrated, equitable, and cost-effective delivery models.

RECOMMENDATION 2D

Expand investment in health innovation to support testing, scaling, and diffusion of promising health service delivery models (e.g., interprofessional team-based care).

4. DOMAIN 3
Workforce



4.1 Sustainability

In this third year of the COVID-19 pandemic, shortages, burnout, and other challenges have been described as reaching a crisis point among the Canadian health workforce. As summarized in Table 9, physicians are approximately evenly divided between generalists and specialists, and a sustained growth in the supply of both has been observed over the past decade. For nurses, a slow and steady growth in the overall supply (per capita) has also occurred. Overall, the supply of nurses in Canada was comparable to that in other OECD countries, whereas the supply of physicians was lower than most other OECD countries (2.7 physicians per 1,000 inhabitants in 2019, as compared with 4.3 in Sweden, 4.4 in Germany and Spain, and 3.2 in France, for example) [67].

Table 9: Physician and nursing workforce per 1,000 population, 2012–2020 (most recent available year)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Family physicians ^a	1.09	1.12	1.15	1.16	1.17	1.2	1.22	1.22	1.23
Specialist physicians ^a	1.06	1.09	1.1	1.13	1.14	1.15	1.19	1.19	1.19
Nurses (total) ^b	11.45	11.60	11.51	11.65	11.71	11.64	11.60	11.74	11.78

Sources: a [68]; b [69]

Nursing vacancies have increased substantially in recent years. For example, in Ontario, nursing job vacancies have been reported to have quadrupled in the past 5 years, and in the first 6 months of 2021, vacancies increased to 56% [70] (Table 10). Between March 2020 and March 2022, vacancy rates in health and social services in Canada increased 90.9% (65,100 jobs), whereas total vacancy rates among all sectors increased 73.6% (890,400 jobs). The largest vacancy increases were observed for auxiliary staff (e.g., care aides and patient service attendants; 84.2%), followed by registered nurses and registered psychiatric nurses (77.8%), and practical nurses (166%). As the cost of living increases, wage increases (+2.4%) have been among the lowest for health and social service workers, along with utility (+1.3%) and education sector workers (-3.5%), in contrast to corporate sectors such as wholesale (+9.4%) and transportation (+8.0%) [71].

Additionally, across Canada, shortages in family physicians have been reported since the 1990s, when policy changes resulted in limited seats in medical schools and restrictions on the recruitment efforts of internationally educated physicians [72]. Family medicine is less frequently being chosen by medical graduates, as illustrated by a 6.7% decrease between 2015 (38.5%) and 2021 (31.8%). The demand is greater than the supply: the number of family physician vacancies outpaces the number of graduating family medicine practitioners. College of Family Physicians Canada has

Table 10: Vacancy and staff turnover rates

Total job vacancies ^a	Q1 2016	Q1 2017	Q1 2018	Q1 2019	Q1 2020	Q1 2021	Q1 2022
Family physicians	65	ND	ND	ND	200	55	ND
Specialist physicians	40	195	245	155	115	195	ND
Nurses	8,070	7,385	9,115	10,595	13,460	20,840	23,620

Notes: Vacancies are not adjusted for seasonality. Data for staff turnover are not readily available.

Source: [65]

stated that the increasing administrative burdens and restrictive compensation models in some provinces (i.e., flat rates per patient irrespective of medical complexity) are unsustainable for family physicians as business owners and primary care experts [73,74].

As indicated in Table 11, a net migration of physicians into Canada occurred from 2012 to 2019. In 2020, however, the inflow and outflow rates as a proportion of the total supply equalled each other. Greater variation is seen in the data for registered nurses. Studies of inflow/outflow in nurses have indicated licensing as a barrier to movement to other PTs, but steady migration to the US, where workers are promised recruitment incentives, advanced education, healthier workplaces, and the ability to work to their full scope of practice, has been observed since the 1990s [75]. For example, in 2010, Canadian nurses practicing in the US were estimated to account for nearly 12% (or 19,699) of licensed nurses [76].

Table 11: Inflow and outflow rates for the health care workforce

Rates as a proportion of total		2012	2013	2014	2015	2016	2017	2018	2019	2020
Outflow rate	Doctors ^a	0.20%	0.28%	0.25%	0.20%	0.18%	ND	0.20%	0.10%	0.11%
	Registered nurses ^b	5.66%	6.97%	5.91%	5.80%	5.67%	5.94%	5.82%	5.70%	ND
Inflow rate	Doctors ^a	0.30%	0.33%	0.26%	0.33%	0.25%	ND	0.16%	0.19%	0.11%
	Registered nurses ^b	6.09%	6.56%	5.96%	6.92%	6.30%	6.25%	6.48%	6.83%	6.90%

Note: Inflow and outflow rates are calculated differently for physicians and registered nurses. Importantly, the inflow (or outflow) rates for physicians capture only the number of physicians returning from (or going) abroad, whereas the rates for nurses capture inflow, as calculated by the number of new registrants to the profession, and outflow as the number of prior registrants who did not register in a given year. Consequently, the inflow and outflow rates for physicians are more accurately described as reflecting the net migration of physicians in and of the country, because they do not account for either new entrants to the profession within Canada (new graduates) or retirements from the profession.

ND = No data.

Sources: a [68]; b [69]

4.1.1 Workforce planning

To date, no national approach to long-term workforce planning exists, despite the insistence of experts and health workers alike [77–80]. As with health service delivery, workforce planning and decision-making are decided at the PT level and substantially vary among jurisdictions and health professions [81–84]. Previous federal governments have attempted to strengthen health workforce planning. As part of the 2004 health accord, the PT governments agreed to develop health human resource strategies, to establish targets to increase supply and address shortages, and to publicly report on progress, although these efforts were never realized [85].

Incomplete and fragmented workforce data challenge governments' ability to effectively plan [81,86]. Wages of health workers account for more than 70% of direct care costs, and physician remuneration represents approximately 8% of a total PT budget; yet, the Pan-Canadian Vision and Strategy for Health Services and Policy Research has reported that workforce research for innovation and planning accounted for only 2.8% of all FPT health service research between 2007 and 2012 [78]. These challenges can be addressed through standardized workforce data collection practices that include information on worker demographics (including race and disability), scope of practice, employment type (e.g., FTE), and work setting [81].

At the PT level, health workforce planning is inadequate and inconsistent. A rapid review has examined workforce planning practices in Manitoba, Nova Scotia, Ontario, and Alberta [87], and found limited evidence of multi-professional workforce planning, and limited consideration of worker productivity or full-time equivalents. Capturing part-time work, as well as trends in burnout, are major gaps that have become even more pressing since the pandemic.

Canada also faces a shortage in unregulated care providers (UCPs). UCPs, including personal support workers/care aides, provide most elder care yet are not regulated or licensed by any regulatory body, nor do they have mandatory education or practice standards. However, data are incomplete to quantify the magnitude of the shortage or to effectively plan. UCPs are relied upon in acute care settings to alleviate workloads of nurses; in home care to help older people age in place; and in LTC homes, where more than 90% of direct care is provided by UCPs [83]. Research suggests that UCPs have the highest rates of turnover in health care, owing to low pay (averaging \$12–24/hour), few opportunities for full-time work and benefits, chronic understaffing, high rates of workplace violence (particularly in LTC homes), and no voice in the facilities or jurisdictions in which they work [83,88]

4.1.2 Geographic variations in physician supply and staffing

Physicians are the second largest profession within the health sector after nursing. Yet, more than five million Canadians lack access to a regular primary care provider [89]. Canadians also experience longer waits for specialist referrals than do peer countries [90,91], and referrals for mental health, addiction, and neurology are the most delayed [91]. The most recent estimates have indicated more than 91,000 practicing physicians in Canada, more than 50% of whom were family physicians, in 2020 [92]. Variations exist within specialties, and infectious disease physicians (10.1 per 10,000) and geriatric medicine physicians (304 in Canada) are among those in the shortest supply relative to other specialties, such as paediatrics, in which the patient to physician ratio is nearly 9 to 1 [91].

Access to specialists is particularly challenging in rural areas, particularly in northern and remote parts of the country. Approximately 18% of Canadians live in rural areas, but only 8% of physicians practice in these areas. As expected, most physicians in the area practice family medicine [92,93]. To address inequitable access, programs such as loan forgiveness have been implemented to entice physicians to work in underserved areas, but the effectiveness of such programs is not yet known [94]. Generally, PTs use a wide range of programs and income incentives to attract physicians to rural areas, and some rural service gaps are filled by international medical graduates.

Across Canada, the lowest densities of specialist physicians are in Saskatchewan and the three territories. Saskatchewan also has fewer family physicians per resident than other Canadian jurisdictions. Alberta, Prince Edward Island, and Manitoba have the lowest percentage of surgical specialists. Ontario and Newfoundland have the highest physician densities in Canada [91]. The distribution of specialists is imbalanced across the country; for example, the number of psychiatrists per capita has grown in Canada from 12.57 in 2000 to 14.39 in 2019 per 100,000 people, but has declined in some provinces such as Ontario and the Northwest Territories, on the basis of data from CIHI's Scott's Medical Database [95]. Very little growth has occurred in the proportion of psychiatrists working in rural areas over this time period, although this specialty might be expected to be broadly distributed across the country. For example, 2.32% of the country's 3,875 psychiatrists worked in rural areas in 2000; this percentage grew to 3.12% in 2019. Some of the imbalances observed in the distribution of physicians among specialties could be addressed within the PT governments' purview by adjusting specialty seats in medical schools and residency programs to align with population needs [81]. However, issues of access are unlikely to be resolved solely by increasing seats. Moreover, no policies exist to align residency programs with population needs, and few support education pathways for under-represented populations in health professions, such as Indigenous, racialized, and lower-income communities.

4.1.3 Task shifting and scopes of practice

The health system has encouraged task shifting (distribution of clinical tasks among health professionals) in Canada, but primarily in the context of cost containment in the absence of strategic workforce planning. Although task shifting creates opportunities to increase job satisfaction and improve efficiency in care delivery, without adequate supports, task shifting for nurses and UCPs is challenged by turnover and high rates of burnout [96]. Table 12 shows the trend in the nursing workforce by place of work, which indicates that most nurses work in hospitals. Although the nursing workforce has grown over the past 10 years, little change has occurred in the number of nurses working in LTC homes, whereas hospital and community health settings have grown more substantially.

Table 12: Nursing^a workforce by place of work (per 100,000)

	Hospital	Community health	Nursing home/ long-term care	Other	Unknown
2011	522.40	136.47	160.64	107.67	34.97
2012	591.64	152.17	169.28	120.51	19.04
2013	614.97	151.47	155.65	126.18	22.82
2014	629.88	157.34	158.54	129.57	7.80
2015	640.18	164.73	165.46	117.56	5.37
2016	638.97	167.74	167.58	115.89	6.93
2017	638.35	168.75	165.93	115.03	3.27
2018	634.05	169.28	165.16	114.99	3.55
2019	608.22	162.60	159.26	110.09	4.63
2020	622.69	167.95	164.46	115.85	1.98

a Includes registered nurses, nurse practitioners, licensed practical nurses, and registered psychiatric nurses.

Source: [69]

In addition to task shifting, governments have expanded the scope of practice for nurses and other providers (e.g., pharmacists) to address access challenges, although variations exist. For example, in Prince Edward Island and the Canadian territories, an insufficient supply of family and specialist physicians has contributed to a higher average density of nurse practitioners and registered nurses who provide primary care and consult physicians virtually when needed [91]. Data from CIHI generally support this finding (Table 13) but cannot explain the higher numbers of both physicians and nurses seen in the other Atlantic provinces relative to the national average. Expanding the scopes of practice can be controversial in areas of higher physician density, because this effort can be perceived as job competition and can affect earnings in professions with overlapping scopes of practice, as seen with nurse practitioners and physicians [91]. During the pandemic, scopes of practice were expanded for several other professions. Although scopes of practice vary by PT, scopes were generally expanded for nurses and pharmacists to prescribe and treat in some settings where physicians were unavailable, or when qualified but unlicensed medical residents were permitted to practice unrestricted [91]. These variations and changes present opportunities to learn from their effects on worker experience and care outcomes.

Table 13: Health care workforce for selected jurisdictions (per 100,000)

Jurisdiction	Region	Family physicians ^a	Specialist physicians ^a	Nurse practitioners ^b	Registered nurses ^b
Prince Edward Island	Atlantic Canada	109	92	31	1,088
Nova Scotia	Atlantic Canada	139	138	23	1,007
Newfoundland and Labrador	Atlantic Canada	131	130	37	1,119
New Brunswick	Atlantic Canada	137	112	19	1,026
Yukon	Territories	168	33	34	1,295
Nunavut	Territories	53	10	68 ^c	1,342 ^c
Northwest Territories	Territories	89	27		
All of Canada		123	130	18 ^d	810 ^d

a Source: [68]

b Source: [69]

c Nursing data for Nunavut and Northwest Territories cannot be separated as these territories are governed by the same regulatory authority.

d Nursing data for all of Canada reflect provinces with available data.

Efforts have been made to expand the supply of nurse practitioners in Canada. Most recent data have indicated that there are 14 nurse practitioners per 100,000 Canadians, more than half of whom work in Ontario (Table 13). Overall, the nurse practitioner profession has doubled in the past 5 years. The scope of practice for nurse practitioners depends on their jurisdiction of practice, but they are trained to diagnose and treat illnesses including fractures, prescribe medication, order and interpret diagnostic tests, and oversee patients in hospitals, as well as operate independent primary care practices in some regions. Additionally, some regions allow nurse practitioners to provide paediatric and neonatal care. Quebec permits nurse practitioners to provide cardiology and nephrology care [97]. Scopes of practice for registered and practical nurses also vary across the country, but estimates suggest that only 61% of Canada’s registered nurses are working to their full scope of practice, thus indicating missed opportunities for improving access to care and worker experience [97].

4.2 Resilience

4.2.1 Consideration of health workers in pandemic plans

The federal guide Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector, amended in 2018, provides suggestions to cancel elective procedures, reallocate workers, call on volunteers, modify scopes of practice, and leverage health profession students. Governments are further advised to enact emergency legislation that can designate workers as essential and therefore compel them, with due compensation, to assist where needed. The federal guide cautions PT governments to make plans according to existing workforce shortages and encourages taking action in advance of a pandemic [20].

At the provincial levels, existing pandemic plans did not appear to adequately consider the existing workforce and its limitations. For example, Alberta’s Pandemic Influenza Plan from 2014 includes reactivating retired health professionals, leveraging students, and redeploying professionals to

specialties in need [98]. This plan also calls on regulatory bodies to “have policy and processes in place to confirm scope of practice to meet health workforce demands during a pandemic influenza” (p.45) but does not specifically detail the extent. Finally, Alberta’s plan notes the potential need to accommodate surge capacity in LTC facilities but has not identified a need to consider workforce shortages in this context [98]. In Ontario, the Commissioner’s report on facility-based LTC during the COVID-19 pandemic revealed a clear lack of preparedness. Ontario’s influenza plan from 2013 was outdated, no pandemic plan was in place in 2020 [39], and the existing influenza plan did not directly address workforce planning [99]. British Columbia’s pandemic plan appeared to contain more comprehensive health human resources guidance. Their updated pandemic coordination plan (based on a 2012 plan) was published early in the COVID-19 pandemic (February 2020), and outlined roles and responsibilities of the province’s health authorities and ministries, including an emphasis on the need for mental health services for health workers and community members alike [100].

4.2.2 Workforce policies in response to COVID-19

Workforce reinforcements and adaptations were widespread across the health system in response to the pandemic. Available data from regulatory bodies in Canada suggests that almost 6,000 non-practicing professionals, such as nurses, physiotherapists, occupational therapists, and pharmacists, elected to return to practice during the pandemic in 2020 [101]. In Nova Scotia, physicians who had retired within the prior 3 years were permitted to re-apply for their license. In Alberta, medical trainees who had completed their residency but not written their licensing exam were authorized to apply for permission to practice without restrictions. All professions enacted emergency licensing protocols to permit re-entrance of workers to the health services workforce. These measures were initially intended to be temporary but remain active in some jurisdictions [102].

Where barriers to increasing the number of workers existed, scopes of practice were expanded to address gaps in service and care for patients. In Alberta, nurse practitioners were authorized as primary care providers in LTC homes. This expansion has been successful, and work is underway to make this shift permanent [102]. In Quebec, chiropractors, midwives, optometrists, or personnel working in health care centres were authorized to conduct COVID-19 testing [101]. Most other PTs expanded the scopes of practice similarly. Another common example across jurisdictions was the authority for some nurses and pharmacists to prescribe and make treatment decisions normally reserved for physicians [91].

New models of care were explored to compensate for service gaps, as seen in LTC facilities, where a lack of infection prevention and control knowledge became apparent among staff and administrators. The Ontario Ministry of Health assigned hospitals to manage some LTC facilities. This process bridged an identified gap in infection prevention and control practices, but the model was not implemented until 8 months into the pandemic, too late to have substantial effects [39].

In acute phases of the pandemic, jurisdictions across the country resorted to rapidly training nurses and physicians to re-deploy to critical care settings to counteract COVID-19 surges and staffing shortages. Ontario developed an online resource (quickicutraining.com) to quickly provide essential training to health professionals redeployed without the regular requisite experience for intensive care unit (ICU) practice [103]. To account for a lack of qualified critical care providers, a medical working group released a revised model of care in October 2020 for the staffing of critical care wards in Ontario during pandemic times. The model is team-based, coordinating teams by competency and experience. Clusters of providers ideally included a skilled intensivist and three physicians with varying critical care experience; one respiratory therapist, one physiotherapist, and one patient support person for every 10 ICU patients; and one experienced critical care nurse and two non-critical care nurses for every five ICU patients [104]. Notably, this model includes registered practical nurses who have historically been restricted from practicing in this setting, where the ICU nurse to patient ratio is traditionally 1:1.

4.2.3 Safety and wellbeing of health workers

Early in the COVID-19 pandemic, a lack of testing capacity resulted in major delays in result turnaround times and reporting channels (e.g., sending results by fax), thus making timely interventions, such as isolating staff and patients, impossible; these outcomes were indicated in Ontario and Quebec, two provinces most affected by the pandemic [26,105,106]. The lack of testing and result reporting processes, paired with a global shortage in PPE and long-standing inadequate federal stockpile management practices [107], required health care workers to reuse single-use equipment [105]. Presumably because of a lack of supply, UCPs, LTC employees, and hospital cleaners were initially excluded from employer-provisioned PPE, thus resulting in disproportionate exposure to the virus [102]. These roles have been well documented to often be filled by women and low income, racialized workers [77].

The federal government played a role in securing and managing the supply of PPE through bulk purchasing, supply and demand modelling, and distribution to PT governments according to an agreed upon formula [107]. In addition, the federal government worked to mitigate the shortage and lack of domestic production by calling on manufacturers to shift to the production of PPE and disinfectant supplies.

Hospital crowding and high mortality rates in LTC homes created unsafe working conditions for health care workers, which were exacerbated by short staffing when providers needed to quarantine or became ill. Understaffing is associated with poor infection control practices, as seen in the LTC sector across Canada [108].

The Canadian health workforce was called on to make extraordinary efforts during an unprecedented time, and the toll has been profound. Government orders gave employers flexibility to cancel vacations, extend hours, and re-deploy staff without repercussions, such as violating collective agreements or contracts [109]. Most (91%) nurses working in public-funded settings are unionized, and collective agreements have historically been signed to protect against such measures [97]. Emergency legislation overrode existing collective agreements, thus resulting in the cancellation of vacations and forced re-deployment for health workers [110,111]. Health care workers united to support Canadians, but a lack of effective relief plans or human resource strategies is contributing to record numbers of nurses planning to leave or considering leaving the profession [65,112].

The increased stress, burnout, and intentions to leave among the health workforce in Canada during the pandemic are well documented [113]. For example, 66% of physicians reported experiencing burnout in 2020, and this figure increased further to 73% in 2021 [114] – a percentage estimated to be twice the pre-pandemic levels [89]. Nurses reported higher levels of stress and overtime work than other health care workers [115]. Mental health and work-life balance also worsened during the pandemic for nearly all health workers, and an average of 18% of health workers stated intentions to leave their job within the next 3 years (with higher rates for nurses and personal support workers) [115]. The general public is also concerned about the health of health care workers: a recent survey found that 9 of 10 Canadians were worried about the mental health of their health care providers and the implications for access that could result from skilled providers leaving direct clinical care positions [109].

Increasing violence against nurses associated with understaffing, inadequate security, increases in patient needs, and harassment of women in health care were known issues before the COVID-19 pandemic but continue to be unaddressed. The 2022 federal budget continues to ignore warnings from workforce experts, CMA, Canadian Nurses Association (CNA), and the alliances formed among these parties in response to what has been described as a workforce crisis [109,116].

In response to these issues, more than 65 health care organizations and 300 workforce experts have established a call to action for the federal government to address this health human resources crisis [109]. In October 2021, the CMA and the CNA initiated an emergency summit with

representation from almost 40 PT and national health care organizations and front-line providers, including allied health workers such as UCPs, respiratory therapists, and psychologists, in response to the pandemic's effects on the health workforce. They have advocated for support for worker mental health and a plan to address long-standing staff shortages [117]. In March 2022, a second emergency summit was held, wherein the multi-disciplinary group indicated that the crisis had worsened, and stated that even early career health professionals are approaching, if not already experiencing, burnout. The key priorities shifted to a call for a multi-professional health human resources strategy that can be realized only with a comprehensive database of Canada's health human resources. The group unanimously concluded that radical transformation was essential for the sustainability of Canada's health care system [116].

4.3 Recommendations

RECOMMENDATION 3A

Strengthen integrated health human resource planning and evaluation with enhanced workforce data infrastructure across occupations, sectors, and jurisdictions, supported by a pan-Canadian agency/body.

RECOMMENDATION 3B

Improve working conditions, education standards, and full-time employment with benefits and adequate wages for elder care workers.

RECOMMENDATION 3C

Strengthen education pathways for health workers from Indigenous, racialized, and low-income communities to address inequities in the health system.

RECOMMENDATION 3D

Move to expanded or full scope of practice to deliver care more efficiently, particularly in primary and community care settings.

RECOMMENDATION 3E

Protect the physical and mental wellbeing of health workers with investment in improved working environments and increased access to mental health support services.

5. DOMAIN 4
**Medicines
and
technology**



5.1 Sustainability

5.1.1 Adoption of technologies

At the federal level, Health Canada is responsible for regulating the safety and efficacy of new technologies and authorizing their use in Canada. CADTH, the leading health technology agency for Canada (excluding Quebec, which has its own), provides recommendations for PTs regarding the funding and use of new technologies on the basis of clinical and cost-effectiveness analyses. Currently, no protocols are in place for the de-adoption of low-value or obsolete technologies, although recently, the CMA publicly called for the federal government to add de-adoption to CADTH's review responsibilities [118]. The assessments conducted by CADTH consider both the clinical and cost effectiveness of the medicines, as well as patient and clinician perspectives [119]. The CADTH follows a transparent procedure for its reimbursement reviews, which are regularly updated (most recently in March 2022) [120]. Funding recommendations from CADTH are a key input to the Pan-Canadian Pharmaceutical Alliance, an alliance of the provincial, territorial, and federal governments that conducts joint negotiations for brand name and generic drugs in Canada, to achieve greater value for publicly funded drug programs and patients through its combined negotiating power.

Concerns have been raised regarding the timely use of new technologies in Canada, although evidence of health improvements with more rapid timelines for use is limited. For example, a study of 37 cancer drugs approved between 1 January 2005 and 1 June 2013 has found that the time to approval by Health Canada was comparable to that of the European Medicines Agency, but both were longer than those of the US Food and Drug Administration [121]. Another study has found that a submission delay to Health Canada relative to European and US markets; i.e., pharmaceutical companies were delayed in submitting new drugs for approval, but the approval processing times were only marginally longer in Canada [122]. For drugs approved to treat rare diseases, one study has found that the provinces vary widely in the time from regulatory approval to public reimbursement; the longest time is in Prince Edward Island, and the shortest times are in British Columbia, Saskatchewan, Manitoba, and Quebec [123]. Differences have also been indicated in the percentages of medicines for rare diseases that are publicly reimbursed in provincial programs; the highest is in Ontario, and the lowest are in the Atlantic provinces [123]. The federal government has made some progress towards timely use, such as by aligning drug reviews between Health Canada and CADTH [124] (Health Canada 2018), by working with international partners to conduct joint regulatory and reimbursement reviews, and, for certain drugs, to make use of the reviews conducted by regulators outside of Canada [125]. Evaluation of the effects of these changes on access to drugs and population health is needed.

A recent systematic review has found that Canada has been successful in conducting clinical trials and supporting evidence-based medicine [126]. However, the review has suggested that Canada is failing in adequately implementing new knowledge into practice. This review has also identified barriers to innovation, including the fragmentation of the procurement and reimbursement policies across multiple hospitals, health centres, and governments, as well as challenges in scaling technologies beyond pilot/local implementation [126]. In addition, challenges in the rapid use of new technologies have arisen from the lack of strategic resource allocation in governments, which have relied on historical budgets to fund regions and hospitals, and have limited ability to transfer funds across departments. Similar challenges have been described in the adoption of new non-drug technologies into the system, including inconsistent approaches to decision-making within and across organizations and limited use of HTAs [127]. Although much of the literature is concerned with the timeliness of use of technology, further research is needed to examine the health effects of new technologies at a population level.

Lower cost generic drugs account for most prescriptions by volume in Canada (77%). However, expensive brand-name drugs account for most expenditures (78%) [128]. Most provincial plans and many private plans have mandatory generic substitution policies at the pharmacy dispensing level.

Notably, generic drug prices are higher on average in Canada than in other countries [129]. As indicated in Table 14, growth in the patented and non-patented drug markets has continued in recent years, although the increase in sales has been greater in generic drugs. Generic drugs have increased as a proportion of total units sold in the Canadian market (from 58% in 2006 to 77% in 2019) and have been relatively unchanged as a proportion of total sales over that time. Patented drugs in total have decreased as a proportion of total sales, from a peak of 73% in 2003 to current levels of approximately 60% (Table 14) [129]. Recent efforts to decrease generic drug prices, such as the agreement struck in 2018 between the Pan-Canadian Pharmaceutical Alliance and the Canadian Generic Pharmaceutical Agreement to reduce the prices of some of the common drugs to 10% of the brand price, has decreased the price gap between Canada and international comparators. However, the gap remains: the median generic prices in OECD countries were 8% lower than prices in Canada in the last quarter of 2019 [129].

Table 14: Sales of patented and non-patented drugs in Canada

Year	PATENTED DRUGS SALES			NON-PATENTED DRUGS SALES		
	CAD (billion)	% of total drug spending	% change year on year	CAD (billion)	% of total drug spending	% change year on year
2012	12.9	59.2%	0.1%	8.9	40.8%	ND
2013	13.4	60.7%	4.2%	8.7	39.3%	-2.2%
2014	13.8	59.9%	3.1%	9.2	40.1%	5.7%
2015	15.1	61.6%	9.4%	9.4	38.4%	2.1%
2016	15.5	60.8%	3.3%	10.0	39.2%	6.4%
2017	16.8	61.5%	7.6%	10.2	38.5%	2%
2018	16.7	59.0%	-0.6%	11.6	41.0%	13.7%
2019	17.2	57.5%	3.5%	12.7	42.5%	9.5%

Notes: Values for patented drug sales and percentage of total drug spending were taken directly from Table 20 in the 2019 Annual Report; the denominator comprises sales of patented and non-patented brand medicines and patented and non-patented generic medicines. The percentage change for non-patented drugs was derived from the available sales data.

Source: [129]

Prices of patented drugs are also high with respect to those in other high-income countries. The prices of patented medicines in Canada were the fourth highest among those in OECD countries in 2019, and were lower than only the prices in Switzerland, Germany, and the US [129]. Given these relatively high prices, the federal government has introduced changes in how prices are regulated, such as the Patented Medicines Pricing Review Board's benchmarking of Canadian drug prices to international drug prices (specifically, the US and Switzerland have been removed from the list of reference countries for external reference pricing). However, some proposed reforms, including the use of pharmaco-economic analysis in setting ceiling prices, and requiring patent holders to provide the government with information on confidential price rebates, have been successfully challenged by the pharmaceutical industry in court and were subsequently removed from the federal government strategy.

5.1.2 Digital health

Virtual care, through telephone or video, rapidly accelerated with the pandemic (as indicated in Table 15), through the introduction of new fee codes to reimburse providers for delivering virtual visits. Experts have indicated many challenges in the rapid escalation of virtual care in the health system, including a lack of integration with existing digital tools and information (such as electronic medical records [EMRs], as indicated in the section below), and an inability to share information across providers to support coordinated care across the continuum; limited ability to measure value for money; and appropriateness and quality of virtual care [131]. The problems seen during the pandemic reflect challenges that were previously identified. For example, the virtual care expert taskforce for the CMA, the College of Family Physicians of Canada, and the Royal College of Physicians and Surgeons of Canada, which was established in March 2019 to “develop a strategy to promote publicly insured medical services by the Canadian health community through virtual means” identified several longstanding issues to be addressed [118]. They have outlined 19 specific recommendations across four domains: (1) interoperability and governance, (2) licensure and quality of care, (3) payment models, and (5) medical education. Their recommendations echo findings from a virtual care taskforce in Alberta in 2021, which made several recommendations regarding the need for standards, for clinically appropriate and safe virtual care, to support equitable access, monitor and evaluate value for money and safety, and support training for health providers. For example, they have indicated that: “A relative absence of enforced data integration standards for software vendors in the Canadian health sector has potential negative implications for interoperability, data stewardship and patient safety in the context of virtual care” [132].

Table 15: Percentage of physicians in selected provinces who provided at least one virtual care visit

Month/year	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
February 2020	30.0%	73.0%	69.9%	78.2%	59.0%
March 2020	76.6%	83.8%	82.4%	87.0%	75.0%
April 2020	85.1%	87.9%	84.5%	91.2%	79.9%
May 2020	85.6%	87.8%	71.4%	90.0%	79.3%
June 2020	85.1%	86.5%	69.2%	89.5%	78.9%
July 2020	84.0%	85.7%	82.1%	89.0%	77.9%
August 2020	82.7%	85.7%	81.6%	88.9%	77.6%
September 2020	82.6%	86.1%	82.6%	89.3%	77.6%
October 2020	82.3%	86.2%	82.8%	89.7%	ND
November 2020	81.8%	87.0%	ND	90.0%	ND
December 2020	80.3%	87.4%	ND	90.1%	ND

Note: Data for Saskatchewan from 1 April to 30 June 2020 are under-reported, because physicians who were part of the Pandemic Physician Service Agreement during this time did not submit claims for the services they provided.

Source: [130]

5.1.3 EMRs

Although some progress has been made in terms of developing virtual care applications to (particularly since the COVID-19 pandemic), more piecemeal advances have been made in other aspects of digital health. EMRs in Canada have been a focal point of research on opportunities for quality improvement at a variety of system levels [133]. Despite broad recognition of the importance of the use of an inter-operable, integrated electronic patient records system within PT health systems, and considerable investments, major challenges remain. Indeed, this issue was one key point raised in the Naylor report *Unleashing Innovation: Excellent Health Care for Canada* in 2015:

Canada lags on many fronts, including meaningful use of those digital resources, secure access to patient records by authorized users to enable safe and seamless care, assurance of digital access to their own records for patients, development of virtual care applications, and achievement of sufficient inter-operability and standardization of data to permit more effective use of all these data for performance measurement and advanced analytics. [134]

The potential for EMRs to be used as a means to collect data for quality improvement purposes has been studied, although not extensively. A review of six EMR initiatives across Canada has found that data are primarily used for improvements at the levels of individuals physicians and organizations/networks [133]. Limited empirical evidence is available regarding the ability of EMRs to improve quality of care, and opinions in Canada are currently mixed [135,136].

The gradual and uncoordinated introduction of patient record systems across primary care practices over the past decades had enabled a shift away from paper records to EMRs for most primary care physicians. However, existing systems are not connected. As indicated by Nav Persaud, “Doctors now log into a myriad of separate systems for primary care and hospital records, laboratory and imaging results, and prescription documentation – systems that usually cannot connect with one another” [137]. Some jurisdictions have scaled up a single EMR system (e.g., the Northwest Territories), although in other jurisdictions, fragmented systems remain in place. A move towards a single vendor for EMRs, ideally an open-source solution, could help address challenges in data sharing and inter-operability [137]; however Ontario MD – a provincial government-funded company owned by the OMA – suggests that the competition from the multiple proprietary EMR companies (e.g., a dozen in Ontario alone) helps drive innovation [138]. Moreover, considerable variation exists in the extent to which patients have access to their own personal health information through EMRs, and access is largely limited and confusing for patients.

Further critiques of the existing EMRs are that the systems were not developed with the view of supporting clinicians in improving their workflow, and not integrated with virtual care delivery platforms. For example, “tools were designed around administrative rather than clinical needs, leading to increased work, decreased satisfaction, and burnout” [131]. A recent report by the Auditor General of Ontario has also found a lack of integration of video conferencing technologies with the EMRs in use in primary care clinics, particularly because they do not use the government funded Telemedicine Network platform. The government provided temporary billing codes for virtual care provided outside the Telemedicine Network platform as a stop-gap measure when in-person visits became untenable [139]. In Alberta, progress has been made through the Connect Care Initiative launched in 2019 to create an “integrated patient-centred charting system” with Alberta Health Services facilities and practitioners. However, 10 unique EMR systems are in use in the province, and most community-based health services are not inter-operable and fall outside of the Connect Care system [132]. Active work is underway to ensure that both Connect Care (in Alberta Health Services facilities) and EMRs in community are integrated with Netcare, Alberta’s electronic health record.

5.1.4 Research and development

Domestic industry investment in pharmaceutical research and development has declined slightly over the past decade, as indicated in Table 16. In addition, the percentage of research and development expenditures as a percentage of GDP is lower in Canada than other countries (although it is comparable to that in the UK) and has declined slightly over the past decade, from approximately 1.8% to 1.6% (Table 17a). Research and development spending as a percentage of total sales in Canada peaked in the 1990s, reflecting a commitment by the industry to increase research and development investment in the country with the abolition of compulsory licensing. Despite this commitment, investment dipped below the 10% commitment in the early 2000s, and has not recovered despite federal and provincial investments and inducements [140].

Table 16: Pharmaceutical research and development expenditures (in CAD million), by type of research, 2011–2019 (most recent year available)

Year	Basic ^a	Applied ^b	Other qualifying ^c	Total
2011	164.9	525.1	265.2	955.2
2012	114.6	525.5	266.9	907.0
2013	67.6	492.2	215.0	774.8
2014	81.8	467.4	217.8	767.0
2015	102.2	456.2	231.7	790.1
2016	105.9	500.9	234.9	841.7
2017	109.9	501.9	222.2	834.0
2018	106.9	517.1	250.2	874.2
2019	116.9	520.2	231.1	868.2

a Basic research is defined as work that advances scientific knowledge without a specific application in mind.

b Applied research is directed towards a specific practical application, comprising research intended to improve manufacturing processes, pre-clinical trials, and clinical trials.

c Other qualifying research includes regulatory submissions, bioavailability studies, and phase IV clinical trials.

Source: [129]

In 2019, research and development spending as a percentage of sales was a 3.9%, a value consistent with the steady downward trend from 10% in 2002 [129]. Commentaries on this decrease in research and development spending suggest that potential drivers of this decline may include insufficient IP protection, supply chain barriers, and corporate tax laws [141–143]. Canada’s Patented Medicine Prices Review Board maintains that, in Canada and other countries, no available data support a link between a country’s pharmaceutical prices or IP protection and attracting research and development.

In terms of spending on health research specifically, as shown in Table 17b, a steady decline has occurred in the percentage of public spending on health allocated to research (from 1.5% in 2011 to 1% in 2021). In this same period, private spending on health research as a proportion of total health spending has been relatively stable, at approximately 2.1%, although this percentage increased sharply, to 2.4%, during the pandemic. FPT government spending on health research also sharply increased during the pandemic, although to a level comparable to that in 2017. Recent investments have led to an enormous amount of research activity related to, and directly supporting government responses to, the COVID-19 pandemic.

Table 17a: Pharmaceutical research and development expenditures as a percentage of GDP, 2011–2018 (most recent year available)

Year	Canada	France	Germany	Italy	Japan	United Kingdom	US	Total OECD
2011	1.8%	2.2%	2.8%	1.2%	3.2%	1.6%	2.8%	2.3%
2012	1.8%	2.2%	2.9%	1.3%	3.2%	1.6%	2.7%	2.3%
2013	1.7%	2.2%	2.8%	1.3%	3.3%	1.6%	2.7%	2.3%
2014	1.7%	2.3%	2.9%	1.3%	3.4%	1.6%	2.7%	2.3%
2015	1.7%	2.3%	2.9%	1.3%	3.3%	1.6%	2.7%	2.3%
2016	1.7%	2.2%	2.9%	1.4%	3.2%	1.7%	2.8%	2.3%
2017	1.7%	2.2%	3.1%	1.4%	3.2%	1.7%	2.8%	2.3%
2018	1.6%	2.2%	3.1%	1.4%	3.3%	1.7%	2.8%	2.4%

Source: [144]

Table 17b: Private and public spending on health research (in CAD million and as percentage of total health spending)

Year	PRIVATE SPENDING		PUBLIC SPENDING	
	Total	% of total health spending	Total	% of total health spending
2011	1,225.90	2.1%	2,086.20	1.5%
2012	1,417.60	2.3%	2,136.60	1.5%
2013	1,461.50	2.4%	2,080.70	1.4%
2014	1,506.70	2.4%	2,205.90	1.4%
2015	1,535.20	2.3%	2,127.10	1.3%
2016	1,535.20	2.2%	2,224.40	1.3%
2017	1,574.70	2.1%	2,335.50	1.4%
2018	1,625.40	2.1%	2,318.80	1.3%
2019	1,660.80	2.1%	2,140.40	1.1%
2020*	1,786.10	2.4%	2,246.10	1.0%
2021*	1,902.00	2.4%	2,370.90	1.0%

* Forecast

Source: [145]

5.2 Resilience

5.2.1 Security of supply

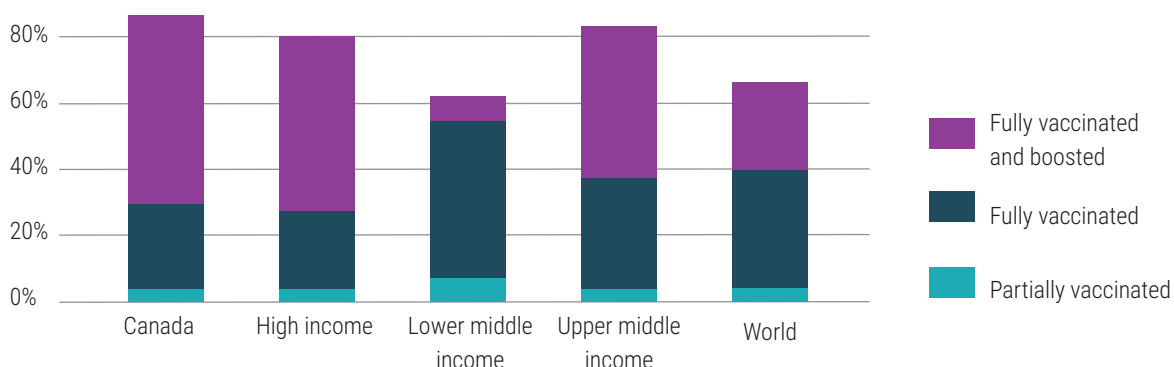
As indicated in Domain 1: Governance, concerns were raised that the national stockpile of PPE was inadequate, thus leading to shortages in early stages of the pandemic across the country. However, a critical drug reserve was established by Health Canada to act as a safety net to ensure a secure supply of select COVID-19 therapies during the pandemic [146]. In addition, the federal government took actions to mitigate shortages in medical supplies and devices. Among the first actions taken, the federal government signed an interim order on 18 March 2020 to allow expedited access to COVID-19-associated diagnostic kits and medical devices [147]. This mechanism is one of the fastest available to the Government of Canada to expedite regulatory review and help make health products available to address large-scale public health emergencies. The government also called on Canadian manufacturers to help meet the impending need for medical supplies, specifically asking businesses to scale production and re-tool manufacturing lines to develop products, including critical health and safety supplies and equipment, such as PPE sanitization products, and diagnostic products. In addition, the federal government signed new procurement agreements with Canadian companies to produce portable ventilators, surgical masks, rapid testing kits, and PPE. Moreover, the federal government waived tariffs (normally up to 18%) on imported medical goods including PPE. Regulatory amendments were made in 2021 (which took effect in March 2022) to mandate the reporting of medical device shortages, as well as other changes, such as authorizing the minister of health to impose terms and conditions on drug and medical device authorizations and extending flexibilities that were applied to COVID-19 drugs to other drugs in specified circumstances (e.g., rolling submissions) [148].

5.2.2 Vaccination rollout

The federal government was largely responsible for vaccine procurement and authorization, distribution of vaccines to PTs; providing scientific guidance on vaccine use; and coordinating pan-Canadian vaccine surveillance and reporting. Very early in the pandemic, the federal government signed advanced purchasing agreements with multiple companies (AstraZeneca, Sanofi, Johnson and Johnson, Novavax, Pfizer, and Moderna). The PTs were responsible for determining the policies and processes for the vaccination rollout in their jurisdictions, including planning, storing, administering, and delivering vaccination programs; determining scheduling of initial and subsequent doses; and managing, tracking, and sharing data on vaccine coverage and adverse events. Many reports and studies have been conducted to compare and evaluate the variations across provinces in terms effectiveness in lowering access barriers and increasing uptake of vaccines across all population and age groups (See Case Study 2). Although variations existed, Canada has achieved a comparatively high vaccine uptake on average with respect to that globally (Figure 2).

Figure 2: Comparison with global vaccination rates by country income classification

Percentage of population by vaccination status
(13 June 2022)



Source: [149]

5.2.3 Information systems and digital technologies

In Canada, as in other countries, several information technology platforms and initiatives were developed to support the pandemic response. However, the inconsistent approaches and limited ability to share data across and within jurisdictions hindered effective and rapid responses to the pandemic [38]. To address these challenges and support the use of real-time data for decision-making, a group of graduate students developed an individual-level data set of confirmed and presumed positive cases of COVID-19 in Canada, as well as an interactive dashboard. The sub-national dataset is available open access and enables the evaluation of historical trends, real-time analysis, and forecasting of pandemic progression [150].

Some successes have been achieved in the public health system in terms of rapid implementation of new digital platforms to support public health activities, such as case management and contact tracing. However, early in the pandemic, challenges were faced because of the reliance on paper-based methods for laboratory notification and on manual data entry, owing to limited inter-operability of data systems [151]. In addition, a COVID-19 exposure notification application (retired in June 2021) was developed with funding support from the federal government, although uptake and use were fairly low, and concerns were raised regarding accessibility (e.g., compatibility with only newer phones) as well as effectiveness in terms of accurate exposure notifications.

5.3 Recommendations

RECOMMENDATION 4A

Support alignment of public drug formularies across the country, such as with a national formulary.

RECOMMENDATION 4B

Leverage the pan-Canadian pharmaceutical alliance to strengthen capacity for effective procurement of drugs and technologies.

RECOMMENDATION 4C

Strengthen the interoperability, transparency, and linkage of electronic health records.

RECOMMENDATION 4D

Strengthen regional, provincial, and national research and development in life sciences and medical technology to support made-in-Canada technological solutions in health care.

6. DOMAIN 5
**Service
delivery**



6.1 Sustainability

Across Canada, access to specialized care is generally contingent on a referral from a family physician. Over time, a shift has occurred away from solo-practice family physicians to groups of physicians working together, sometimes with other professions (such as nurses, but sometimes other professions such as social workers or pharmacists). A gradual shift has also been observed away from costly inpatient care to day-case procedures performed in hospitals or in private clinics specializing in specific surgical or diagnostics procedures [2]. Other trends in the delivery system relate to information technology: efforts have been made to connect and increase the interoperability of the unique electronic health record systems in place in primary care practices and hospitals [2]. However, patient access to these systems remains limited in most jurisdictions.

Inefficiencies in the Canadian health systems are widespread and relate to the inappropriate use of higher cost services/care settings and fragmented delivery systems, with limited attempts to coordinate and integrate care across the care continuum. Yet indicators for specific sectors of the health system, such as hospitals, suggest relatively high efficiency with respect to that in other countries. Since 2016–2017, when data were reported by CIHI, consistently low rates of readmission (approximately 9% of all patients within 30 days) have been observed, with minimal variation across the country [2]. In addition, whereas average lengths of stay have remained steady at approximately 7 days – longer than those in peer countries such as the UK, Australia, France, and the US – hospital occupancy rates are consistently higher than those in these countries [2]. One reason for relatively high average length of hospital stay in Canada relates to the challenges in discharging patients who no longer need specialized acute care but could be cared for with appropriate supports at home or in LTC homes.

Indicators of inappropriate use of higher cost care/care settings include delayed hospital discharge, referred to as alternative level of care (ALC), as well as potentially avoidable LTC home admission. Drivers of ALC in hospitals relate to care coordination problems, and inadequate supply and lengthy wait times to receive LTC services in home and residential facilities, among others [152]. CIHI reports that in Canada, on average, more than 11% of new admissions to LTC homes could have been cared for at home; moreover, significantly higher rates of potentially inappropriate admissions occur in Manitoba, British Columbia, New Brunswick, and Yukon [153]. Furthermore, 2019–2020 estimates from Ontario suggest that 1.3 million hospital bed days were used by ALC patients, thus contributing to a ‘bottleneck’ and exacerbating surgical wait times [154].

Table 18: Percentage of patients readmitted to hospitals within 30 days

Jurisdiction	2016/17	2017/18	2018/19	2019/20	2020/21
Alberta	9.2%	9.2%	9.5%	9.5%	9.2%
British Columbia	9.9%	10.0%	10.0%	10.0%	10.1%
Saskatchewan	10.0%	9.9%	10.0%	10.2%	10.0%
Manitoba	8.8%	9.0%	9.4%	9.4%	9.4%
Ontario	9.3%	9.3%	9.6%	9.7%	9.6%
Quebec	8.6%	9.0%	9.0%	8.9%	ND
New Brunswick	8.7%	8.8%	8.8%	8.7%	9.2%
Nova Scotia	8.8%	8.6%	8.8%	8.8%	8.8%
Prince Edward Island	8.7%	9.0%	8.9%	9.0%	8.5%
Newfoundland and Labrador	9.0%	9.2%	9.3%	9.5%	9.3%
Nunavut	ND	11.0%	11.8%	ND	ND
Northwest Territories	9.1%	9.5%	9.4%	10.2%	11.1%
Yukon	9.1%	10.6%	9.7%	9.7%	9.5%
Canada	9.2%	9.2%	9.4%	9.5%	9.4%

Source: [155]

6.1.2 Quality and sustainability

The quality of medical care in Canada is comparable to that in other peer countries; the performance is higher in some indicators, such as cancer survival rates, and lower in others, such as stroke and AMI mortality rates (in hospital) [2]. On the basis of the composite indicator of quality that standardizes rates of avoidable causes of death according to the prevalence of certain health conditions, the Health Access and Quality Index in Canada outperforms those in the US, UK, and France, but ranks below those in Australia, Sweden, and the Netherlands [156]. However, this analysis has not been updated since 2016.

Approaches and the level of sophistication of measuring and monitoring quality of care vary across the country. CIHI sets standards and compiles a vast array of databases shared by the PTs to enable use of some Canada-wide and international quality of care and patient safety indicators, which have historically been limited to hospitals, but increasingly have expanded to LTC homes. Each PT collects and monitors quality of care for its jurisdiction, and several have established a dedicated arm's-length government agency or quality council, some with legislation that mandates public reporting of quality or safety measures at the hospital or LTC home level [157]. Although these PT quality agencies also develop standards for clinical quality and patient safety, the use of these standards is not monitored or reported publicly, nor do they have any power to enforce quality improvements when standards fall short. At the national level, Canada relies on a system of voluntary accreditation conducted by a non-governmental organization called Accreditation Canada. In addition, the federally funded pan-Canadian health organization Healthcare Excellence Canada has a mandate to support the spread of innovation and policy change to improve health care safety and quality.

Care for the aged population has been a long-neglected subsector in the Canadian health system, including inadequate and ineffective home care, and poor quality residential LTC. Quality standards for LTC facilities are in place across all PTs. Growing awareness of unsafe, poor quality, and inadequate care – which was amplified during the COVID-19 pandemic – has led to renewed calls for quality standards at the national level and tying these standards to increased federal funds for LTC [39,158]. HSO is currently revising the national standards for LTC service delivery in collaboration with the Canadian Standards Association [159]. HSO projects the publication and final approval by SCC to be completed by December 2022 [160]. An ongoing blind spot in LTC is that most LTC is provided in the home, not residential settings [158]. Yet home care services are not consistently regulated, and no current practices reliably compare and contrast home care effectiveness/gaps across jurisdictions [161]. The standards being developed will not address these gaps, because they do not consider Canadians receiving home care services that can reduce hospital and LTC facility admissions.

Inappropriate care is both an efficiency and a quality challenge in Canada, and has been the focus of the not-for-profit organization Choosing Wisely Canada (CWC). A report by CIHI and CWC reported that for 8 of the 200 CWC recommendations that could be measured with available data, approximately 30% of tests and treatments performed were potentially unnecessary [CIHI 2017, as cited by 2]. A recent systematic review has documented the types of inappropriate care across a different set of interventions and also found that 30% of care in Canada is inappropriate [162]. Although the earlier CWC report focused only on overuse, this systematic review considered both underuse (e.g., of clinically recommended diagnostics and preventive medicines) and overuse (e.g., polypharmacy, and specific drugs), and found significantly higher underuse than overuse [162]. These findings suggest that substantial room for improvement exists in the appropriate, and thus efficient, delivery of care [163].

Use of financial incentives has been limited in primary or secondary care for meeting quality standards in Canada. Where such incentives have been used, the intended effects were not realized, as might be expected. In Ontario, bonus payments are given physicians to provide preventive services such as immunizations and cancer screening, but evidence of any effects is limited. In addition in Ontario, financial incentives for hospitals to reduce emergency department length of stay have had only marginal effects [164]. Furthermore, bonus payments to psychiatrists to increase access to psychiatric care in the community for people who had been hospitalized for mental health problems have indicated no effects on access to follow-up care or on the supply of psychiatrists in community settings [165]. Similar findings have been reported in other provinces, such as in British Columbia, where the introduction of bonus payments to primary care physicians to improve continuous comprehensive care for people with multiple chronic conditions has had no observable effects these outcomes [166]. In addition in British Columbia, another study has found that an incentive payment to hospital physicians to prepare a hospital discharge plan had limited uptake and no effects on hospital readmission [167]. The varied approaches used across the country, all with minimal impacts, suggest a need to refocus payment reform efforts away from bonus payments towards a more effective suite of interventions that provide supports for physicians (including sufficient income but also support staff and other resources), to provide quality care and support patient outcomes rather than interventions (see Domain 3: Workforce).

6.1.2 Primary care and care coordination

Although family physicians/primary care providers generally serve as the first point of contact for health care and are meant to also help coordinate care for their patients, the many challenges to achieving such a system include (1) a large segment of the population lacking a regular primary care provider, (2) the declining proportion of family physicians providing comprehensive primary care, and (3) a persistent lack of integration between primary care and other health and relevant social services.

The first issue – that not all residents have a regular primary care provider – has been a persistent challenge across Canada and, among provinces, particularly in Quebec, where more than 20% of residents do not have a regular family physician [168]. One response to this challenge, as seen to varying degrees across most provinces, has been to implement centralized waiting lists; however, these are unlikely to affect unattached patients, because they remain primarily a tool for providers to find new patients, and do not influence the supply, distribution, or practice-models of providers [169].

The second issue that affects the quality of primary care is the declining trend that is observed in the proportion of family physicians providing comprehensive care. Although the overall spending on, and supply of, physicians continues to increase over time (see Domain 3: Workforce), the decline in the proportion of family physicians providing comprehensive primary care has decreased in both Ontario and British Columbia. Declines in comprehensive care pose challenges to ensuring access to high quality primary care, even for patients who have a regular care provider [170–172].

The third issue (lack of integration) reflects the ‘founding bargain’ of Canadian Medicare, in which physicians maintain autonomy over the management of their practice in return for supporting the establishment of universal health coverage with the province/territory as a single payer. Although most provinces (except Ontario) established regional health authorities throughout the 1990s to consolidate responsibility for hospital care, community care, LTC, and public health, the responsibility for funding physicians remained with the provincial government across all provinces, thus limiting physicians’ accountability to service delivery organizations. The limited integration is also partly a function of the lack of interoperability of information systems, which challenges the sharing of patient information across providers.

Although regional health authorities were expected to improve the continuity of care and contain costs by encouraging more upstream preventive care and shifting hospital care to lower-cost home and community care [173], these effects have not been seen. Many provinces have since consolidated these regional entities into single province-wide authorities responsible for managing the entire health system although retaining the authority’s responsibility for a range of health services and the status of the authority as at arm’s length from governments. According to one argument, regions could better achieve their integration goals if physicians were funded by and brought into the governance and leadership of these regional authorities, and if physicians contributed to the management of a results-driven system that holds providers accountable for providing high quality care across the continuum [174]. Similar proposals for increased financial and managerial responsibility of physicians were also included in the final report of an Ontario Expert Advisory committee on primary care [175]; although these were not adopted.

Numerous efforts have been made to improve care coordination, through system reform generally and primary care reform specifically. Efforts include the formation of voluntary partnerships and teams that unite professionals to coordinate care for a defined patient population, such as with Ontario Health Teams and clinical networks (e.g., in British Columbia and Alberta). Primary care networks have been in place since the early 2000s in Alberta, and have evolved over time to take on a more central role in the governance of health care delivery system in that province [176], although the impacts of these and other reforms on quality and efficiency of care delivery, and on health, are not yet known.

Efforts have also been directed towards the referral processes from primary to secondary/specialized care. Long-wait times to see a specialist or receive elective surgery have long characterized health care in Canada [2]. According to the CMA, timely referral to specialists is recognized by both physicians and patients as a major problem. Key issues raised include a lack of timely access to specialists, ineffective communication (doctor-doctor and doctor-patient), regional shortages, lack of standardization, or unclear wait times at the point of referral. Moreover, referral processes vary widely among specialties and specialists within a specialty area. Some provincial initiatives have been implemented to help address these problems [177], thus presenting an opportunity to learn and potentially scale up across the country.

6.1.3 Persistent inequalities in access to care and an inadequate population health approach

Geographic inequalities in access to care are substantial in Canada, owing to the concentration of both the population and health care providers in the southern part of the country that borders the US, and the low population density elsewhere. Care provision outside the concentrated southern urban parts of the country has been characterized by (1) heavy reliance on costly and disruptive medical transportation and (2) longstanding but inadequate use of virtual care and electronic referral services. A 2019 study has found that medical travel, which includes expensive air travel that is the only option for communities not accessible by road, accounts for a substantial proportion of health expenditures in Nunavut (20%), as compared with 5% in Northwest Territories [178].

Extensive literature has indicated substantial inequalities in access and quality of care across other social and economic dimensions, including income and education, with barriers to access and poor quality of care disproportionately affecting low income, racialized, and Indigenous communities. In addition, awareness and documentation of the ongoing barriers to safe, high-quality care among Indigenous Peoples in Canada are increasing. The tragic high-profile preventable deaths of Brian Sinclair (in 2008), Joyce Echequan (in 2020), along with recommendations from the Truth and Reconciliation Commission [179], have led to numerous statements and commitments aimed at addressing systemic racism, and improving care and outcomes for Indigenous Peoples. A major review of Indigenous-specific racism in the health system in British Columbia (*In Plain Sight*) has highlighted the problems: “Indigenous people told us that they encounter racism and discrimination in the British Columbia health care system, including stereotyping, unacceptable personal interactions and poorer quality of care” [180]. British Columbia was the first province to introduce new legislation that used the UN Declaration on the Rights of Indigenous Peoples (in 2019), and in March 2022 published several actions that the government will take to implement these standards [181]. The federal government also developed *Canada’s Anti-Racism Strategy* (2019–2022), and dedicated funding in 2021 to strengthen cultural safety and increase Indigenous representation in the health workforce [182].

System managers and providers are aware of the importance of focusing on prevention and health promotion. However, these broad goals have not translated to dedicated funding or specific targets, e.g., to alleviate the burden of chronic diseases. Some movement has been made towards funding and monitoring access to mental health services, which are increasingly recognized as a priority by FPT governments. However, mental health services not provided in hospitals or by physicians are not considered medically necessary under the *Canada Health Act*. Specifically, whereas mental health services provided by physicians are fully funded by PT health systems, services by psychologists are largely privately paid for through private insurance or out-of-pocket payments, thus creating financial barriers to access. Family physicians may either provide mental health services or refer patients to community mental health and addiction services that are funded through the PT health system (including case management and community-based crisis services) [2]. Mental health and addiction services were among the priorities of the recent bilateral funding agreements totalling \$11 billion over 10 years, made between the federal government and each of the PTs in 2017–2018) [183]. The dedicated funding for mental health (\$5 billion) is aimed at supporting an increased supply of mental health and addictions services in the community, for example with improved access to school-based mental health programs, and expanded crisis intervention services.

6.2 Resilience

6.2.1 Maintaining services in a crisis

Substantial disruptions to care were evident during the pandemic, thus suggesting major implications regarding the already lengthy wait times for elective surgeries, diagnostic services, and public health programs and services. Major disruptions to mental health service delivery also

occurred. Mental health was the focus of the federal government’s Wellness Together Canada initiative, for example, which provides free counselling and connects people to services and programs across the country.

In terms of acute care, CIHI reported on the changes in health care utilization during the period of the pandemic from March 2020 to June 2021. Over that time, the number of surgeries performed decreased (with respect to 2019) to approximately 560,000; the greatest decreases were in relatively less urgent procedures, such as hip and knee replacements, whereas effects on cardiac care were moderate, and no change in hospitalization for childbirth was observed² [184]. A study from Quebec has estimated that by mid-April 2020, a 60% decrease in myocardial infarction consultations has already occurred, thus suggesting a major disruption to routine care for chronic conditions [105]. Media reports in Quebec have estimated that 2 years would be required to bring wait times to below the provincial target of 6 months for surgical procedures, through a strategy involving a combination of “finding ways to optimize the use of operating rooms, using private clinics, rearranging waiting lists, and increasing the availability of health-care staff” [185]. Alberta’s strategy to decrease volume-associated strain in hospitals was to increase the number of non-complex surgeries in publicly funded non-hospital surgical facilities [186].

The CMA commissioned an analysis of the disruptions to care caused by the pandemic [114], which has estimated that 70% of the costs that would be needed to clear the backlog and restore wait times to pre-pandemic levels are concentrated in three procedures: cataract surgeries, and MRI and CT scans. An earlier analysis has estimated that an approximately 6% increase in volumes would be needed to address the backlog [187]. In addition according to data from the first year of the pandemic, another study has found that between March and June 2020, the estimated backlog in Ontario was nearly 150,000 surgeries, which would require approximately 84 weeks to clear [188] (Table 19). Importantly, the disruptions to care spanned the full care spectrum, including “preventive care, cancer screening, surgeries and procedures, routine immunizations, and diagnostic tests such as MRIs and CT scans, mammograms, and colonoscopies,” thus causing physicians to see “patients sicker than they ought to be because of serious conditions left undetected or untreated during the pandemic” [154]. Moreover, the effects of these care disruptions are inequitable and disproportionately affect communities which are racialized, precariously housed, lower-income, and in rural or remote areas [154].

Table 19: Percentage of surgical patients treated within benchmark timeframes^a

Surgery	2016	2017	2018	2019	2020
Hip replacement	78%	76%	75%	75%	56%
Knee replacement	72%	68%	69%	70%	40%
Cataract surgery	73%	71%	70%	71%	45%
Radiation therapy	97%	97%	97%	97%	98%
Hip fracture repair (inpatient) ^b	86%	87%	88%	86%	86%

a Excludes territories.

b Data exclude Québec.

Source: [189]

² Note that these data exclude Quebec.

Reports have indicated a disruption of public health services caused by the reallocation of public health work to address the pandemic. For example, a survey by the Association of Local Public Health Agencies in Ontario has found that most public health units (20 of 30 surveyed) devoted more than 80% of their resources to the pandemic in 2021 [190]. This survey has also found that most of the programs and services that public health units deliver (as detailed by Ontario Public Health Standards) were incomplete (ranging from 13% of the work for school health, and 21% of the programs in substance use and injury prevention, to 56% and 58% of emergency management and infectious diseases control, respectively, which were mostly for COVID-19). Similarly, an expert roundtable has outlined several components of a 'catch-up strategy' for Ontario to address the disruptions to routine vaccinations for school-aged children, including developing a universal and centralized electronic immunization registry; providing catch-up immunization in schools, community-based programs, primary care offices, pharmacies and mass vaccination centres; and implementing a coordinated communication strategy to reach key stakeholders [191].

Acute care capacity was insufficient to manage the increase in demand during numerous waves of the pandemic. Field hospitals were built in several major cities in Canada, including Toronto, Vancouver [192], Calgary, and Edmonton [193,194]. Hospitals in Canada were operating at close to full capacity, with average occupancy rates higher than those in comparable countries. Initially, inpatient occupancy levels in Canadian hospitals markedly decreased, with levels in March 2020 falling by nearly 35% relative to 2019. Overall, between March 2020 and June 2021, 11% fewer patients were admitted to hospitals with respect to the pre-pandemic period. As the pandemic continued, however, ICU use gradually increased [184]. CIHI reported a significantly increased use of hospitals, ICUs, and ventilators for respiratory conditions (most of which were due to COVID-19) during the pandemic:

In ICUs, from March 2020 to June 2021, there were almost 14,000 additional respiratory admissions, compared with the pre-pandemic period. In fact, by Wave 3, the need for ICU care and ventilators among respiratory patients had increased by approximately 400%. [184]

The COVID-19 pandemic provided a unique window of opportunity to rapidly invest in, promote, and expand virtual care across Canada. A recent CIHI report on data from five provinces has revealed that before the pandemic, virtual care services ranged from 2% to 11% of patient care in 2019, compared with 24% to 42% a year later [195]. Persistent barriers to virtual care pre-pandemic included a lack of physician billing capacity, knowledge gaps, lack of funding, lack of information technology infrastructure, privacy concerns, and decreased quality of care [196]. Although available data do not indicate how quality of care might have been affected, an influx of policy changes and funding paired with the desire to minimize personal infection risk to providers and patients has fostered the rapid shift in care.

The rapid expansion of physician billing codes for virtual care were integral in shifting to virtual care. For example, virtual care companies such as Maple and Telus, among others, were for the first time able to invoice the public health care system for physician services [196]. Additionally, the increased digital health infrastructure capacity built on existing home monitoring capabilities in British Columbia and Saskatchewan for home recovery for COVID-19 and eligible post-surgical patients, respectively [196,197]. Additionally, owing to a significant increase in need, various virtual mental health services have been made available in Alberta (e.g., online forums), Manitoba (e.g., self-directed CBT), and resource centres in New Brunswick, Newfoundland, and Prince Edward Island. In Ontario, virtual emergency departments were activated to reduce strain on burdened emergency departments and provide access for those avoiding care out of fear of contracting COVID-19 [196]. Finally, virtual care has helped strengthen physician-specialist referral processes historically viewed as inefficient. British Columbia and Ontario piloted integrated referral systems in recent years that were relied on for enhancing capacity during the pandemic [177,198]

However, concerns regarding inequitable access to virtual care persist. Before the pandemic, rural, remote, and Indigenous communities had inadequate access to specialist care. British Columbia developed a Real-Time Virtual Support program that enables primary care providers supporting these communities 24/7 access to maternity, paediatric, emergency, and critical care consultations. Other specialists can be accessed, although not immediately. Furthermore, remote and rural communities, particularly Indigenous communities, do not have equitable or uniform access to providers in person or to the digital infrastructure (e.g., internet or digital literacy) required for virtual care [196]. Recent estimates of access to virtual physician care in Canada suggest that higher income groups and the working age population had higher proportions of physician services through virtual means, thus suggesting some possible barriers to virtual care for lower income and older age groups [195].

Table 20: Proportion of family physician visits provided virtually, by province

Month/year	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
February 2020	0%	0%	0%	4%	1%
March 2020	22%	19%	26%	14%	30%
April 2020	55%	56%	ND	46%	71%
May 2020	50%	44%	ND	38%	66%
June 2020	47%	34%	ND	28%	61%
July 2020	42%	28%	44%	24%	57%
August 2020	38%	27%	42%	22%	56%
September 2020	39%	29%	42%	22%	57%
October 2020	38%	30%	44%	22%	55%
November 2020	39%	39%	50%	25%	58%
December 2020	42%	43%	52%	32%	60%
January 2021	46%	40%	49%	29%	ND
February 2021	45%	39%	48%	27%	ND
March 2021	43%	36%	47%	25%	ND

Note: Data for Saskatchewan from 1 April to 30 June 2020 are under-reported, because physicians who were part of the Pandemic Physician Service Agreement during this time did not submit claims for the services they provided.

Source: [130]

6.3 Recommendations

RECOMMENDATION 5A

Reform primary care to serve as the main access hub for an integrated suite of preventive, diagnostic, treatment and palliative services in the community.

RECOMMENDATION 5B

Scale up innovative strategies and multidisciplinary team-based models of primary care, prioritizing underserved communities and optimizing the available workforce.

RECOMMENDATION 5C

Support the implementation of pan-Canadian quality standards throughout the health system, and facilitate the measurement and reporting of performance on a regular basis.

RECOMMENDATION 5D

Take a life-course perspective to plan for and invest in high-quality LTC across the continuum of services and supports.

7. DOMAIN 6

**Population
health and
social
determinants**



7.1 Indicators of population health

As shown in Tables 21–23, indicators of population health indicate an overall decline or plateau in health according to several measures in recent years. For example, before the onset of the COVID-19 pandemic, a slight decline in life expectancy at birth due occurred because of the opioid crisis. The most recent data show a further decline due to the pandemic. In addition, rates of infant mortality increased slightly, to 4.8 deaths per 1,000 live births, and remain among the highest rates in OECD. Moreover, in 2020, COVID-19 replaced accidental poisonings (opioids primarily) as the third most common cause of death. The increased mortality from COVID-19 (both directly from the disease itself and indirectly from broader societal impacts of the pandemic, such as decreased health care contact) led to further declines in life expectancy. On average, the data suggest that, in Canada, life expectancy declined by approximately 5 months because of the COVID-19 pandemic, although the decline was approximately twice as high in Quebec (10 months shorter life expectancy in that province) [199].

Linking vital statistics and national surveys with census data allows for routine disaggregation of health indicators and public reporting. For example, inequalities in health by average neighbourhood income level have been shown to be sustained and even widened over time for some health indicators, such as smoking rates [200]. The COVID-19 mortality rate was significantly higher among lower income neighbourhoods, and the highest rates of mortality were observed among Black communities. A disproportionately high risk of mortality was also observed among people of South-Asian descent, older adults, residents of dwellings in which the number of occupants exceed the number of available bedrooms and multi-home complexes [201], and older people living in institutional settings [202].

Canada lacks a comprehensive health data strategy. The pandemic has underscored the need for such a strategy, because the global trends of disproportionate rates of illness and death associated with COVID-19 in marginalized and racialized populations have been observed in Canada but cannot be accurately quantified, given current limitations in data practices [203–206]. Several data gaps have been identified, such as a lack of disaggregated data on the Canadian population (e.g., race, gender, and socioeconomic status), and health status and outcomes. Additionally, data are not linked and cannot be compared between jurisdictions at the community or individual levels [203,206]. This lack of disaggregated data has delayed awareness among decision-makers regarding the extent of health inequities experienced by marginalized people before the COVID-19 pandemic; those inequities have translated into higher mortality and morbidity rates throughout the pandemic [32,33,204].

Although data are not routinely collected, racialized communities in Canada on average have a higher incidence of family and child poverty, and are more likely to live in underprivileged communities, experience financial insecurity, work in low-income jobs, and die prematurely [32,207–209]. Indigenous and racialized communities are also more likely to have inconsistent access to health care and poor health outcomes [201,204]. Inequalities in health between Indigenous and non-Indigenous populations are particularly stark and persistent, thus creating a life expectancy gap exceeding 10 years. These health inequalities have roots in colonization, a process that entrenched “social, political, and economic determinants that benefit white settler societies, often to the detriment of Indigenous lands, waters, cultures, communities, families, and individuals,” and subsequent acts of genocide and forced assimilation, such as establishment of residential schools [210]. Health inequalities further stem from persistent barriers to access to social determinants of health, such as housing, safe living conditions, employment, and health care, all of which are enabled by systemic anti-Indigenous racism [210].

Social inequalities were exacerbated during the COVID-19 pandemic [211]. For example, a report from Statistics Canada (based on 2016 census data associated with a survey using crowdsourcing) suggest that, because visible minorities experience more hardship because of inadequate structural determinants of health (SDH), they are more likely to experience additional hardships due to COVID-19 associated job losses, reduced incomes, and working in high-exposure settings [207].

Understanding the experiences of racialized communities in Canada is a major blind spot in policy making. Despite research and extensive advocacy work over the course of decades, there has been no resolve this issue [204]. An example of a community response to this issue came from the Ottawa Local Immigration Partnership in 2020, with the development of their *Strengthening Disaggregated Sociodemographic Data Related to COVID-19* project. In collaboration with the Canadians of African Descent Health Organization and the University of Ottawa, a data collection framework was developed in addition to SDH quality indicators that can create meaningful visibility for historically invisible groups [203]. Provincially, Manitoba and Ontario implemented race-based data collection early in the pandemic, although most provinces have not followed suit [204].

Owing to a lack of available data to illustrate the experiences of those ‘under the curve’, populations that were already disadvantaged before the COVID-19 pandemic were further disenfranchised by government pandemic containment measures [32,204]. The federal government has acknowledged the importance of disaggregated data that facilitate analysis and resolutions with respect to SDH. Investments in the development of a health data strategy have been declared a priority, yet concrete action steps and designated leadership remain unclear [32].

Comprehensive reports have been released throughout the pandemic, such as the Chief Public Health Officer of Canada’s Report on the State of Public Health in Canada 2020, which takes an equity approach to move towards resilience from risk. This report also acknowledges the disproportionate effects of COVID-19, whose health impacts have been more severe on older people, low-income communities, essential workers, racialized populations, people with disabilities, and women. To achieve health equity and to protect all Canadians from the threat of COVID-19 and future pandemics, a need exists to provide health, social, and economic protection. The report proposes an equity approach built on four high impact areas [32]:

1. Economic security and employment conditions
2. Stable housing and a healthy built environment
3. Health, education, and social service systems
4. Environmental sustainability

Table 21: Three-year average life expectancy, 2010–2020

Life expectancy (at birth)	2010–12	2011–13	2012–14	2013–15	2014–16	2015–17	2016–18	2017–19	2018–20
Males	79.4	79.6	79.7	79.8	79.9	79.9	79.9	80.0	79.8
Females	83.7	83.8	83.9	83.9	84.0	84.0	84.0	84.2	84.1
Both	81.6	81.7	81.8	81.9	81.9	81.9	82.0	82.1	82.0

Source: [212]

Table 22: Population health measures (both sexes, unless otherwise stated), 2012–2021

Population health measure	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Infant mortality rate (per 1,000) ^a	4.8	5.0	4.7	4.5	4.5	4.6	4.8	4.4	4.5	4.8
Maternal mortality rate (per 100,000) ^b	5.76	6.05	5.99	7.06	6.26	7.16	8.82	8.6	8.37	5.76
Prevalence of undernourishment ^c	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	ND	ND	ND
Low birth weight rate (<2,500g) ^d	6.2%	6.3%	6.4%	6.4%	6.5%	6.6%	6.6%	6.7%	ND	ND
Age-standardized cancer incidence rate (per 100,000) ^e	530.4	524.6	519.2	517.2	514.6	500.3	514.9*	515.0*	515.0*	515.2*
Age-standardized diabetes incidence rate (per 100,000) ^f	619	627	615	614	616	598 ^g	ND	ND	ND	ND
Age-standardized hypertension incidence (per 100,000, ages 20+) ^f	2,235	2,210	2,115	2,048	1,985	1,942 ^h	ND	ND	ND	ND
Self-reported rate of smoking (occasional or daily) ⁱ	ND	ND	ND	17.7%	16.9%	16.2%	15.8%	14.8%	12.9%	ND
Self-reported obesity rate (adults aged 18+) ⁱ	ND	ND	ND	26.1%	26.5%	26.9%	26.8%	27.7%	28.2%	ND

a Source: [213], values for infant mortality reflect total infant deaths, age at time of death, under 1 year.

b Source: [214], values for maternal mortality reflect deaths from all obstetric causes.

c Source: [215]

d Source: [216], source does not specify units of measurement.

e Source: [217], excludes Quebec; rates are age-standardized to the 2011 population.

f Source: [218], g = excludes Nunavut, h = excludes Nunavut and Northwest Territories.

i Source: [199]

* = Forecast; ND = no data

Table 23: Leading causes of death, all ages, 2011–2020

Rank	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	Malignant neoplasms	Malignant neoplasms	Malignant neoplasms	Malignant neoplasms	Malignant neoplasms	Malignant neoplasms	Malignant neoplasms	Malignant neoplasms	Malignant neoplasms	Malignant neoplasms
2	Heart disease	Heart disease	Heart disease	Heart disease	Heart disease	Heart disease	Heart disease	Heart disease	Heart disease	Heart disease
3	Cerebrovascular diseases	Cerebrovascular diseases	Cerebrovascular diseases	Cerebrovascular diseases	Cerebrovascular diseases	Cerebrovascular diseases	Accidents (unintentional injuries)	Accidents (unintentional injuries)	Accidents (unintentional injuries)	COVID-19
4	Chronic lower respiratory diseases	Accidents (unintentional injuries)	Chronic lower respiratory diseases	Chronic lower respiratory diseases	Chronic lower respiratory diseases	Accidents (unintentional injuries)	Cerebrovascular diseases	Cerebrovascular diseases	Cerebrovascular diseases	Accidents (unintentional injuries)
5	Accidents (unintentional injuries)	Chronic lower respiratory diseases	Accidents (unintentional injuries)	Accidents (unintentional injuries)	Accidents (unintentional injuries)	Chronic lower respiratory diseases	Chronic lower respiratory diseases	Chronic lower respiratory diseases	Chronic lower respiratory diseases	Cerebrovascular diseases
6	Diabetes mellitus	Diabetes mellitus	Diabetes mellitus	Diabetes mellitus	Influenza and pneumonia	Diabetes mellitus	Influenza and pneumonia	Influenza and pneumonia	Diabetes mellitus	Chronic lower respiratory diseases
7	Alzheimer's disease	Alzheimer's disease	Influenza and pneumonia	Influenza and pneumonia	Diabetes mellitus	Alzheimer's disease	Diabetes mellitus	Diabetes mellitus	Influenza and pneumonia	Diabetes mellitus
8	Influenza and pneumonia	Influenza and pneumonia	Alzheimer's disease	Alzheimer's disease	Alzheimer's disease	Influenza and pneumonia	Alzheimer's disease	Alzheimer's disease	Alzheimer's disease	Influenza and pneumonia
9	Intentional self-harm (suicide)	Intentional self-harm (suicide)	Intentional self-harm (suicide)	Intentional self-harm (suicide)	Intentional self-harm (suicide)	Intentional self-harm (suicide)	Intentional self-harm (suicide)	Intentional self-harm (suicide)	Intentional self-harm (suicide)	Alzheimer's disease
10	Nephritis, nephrotic syndrome, and nephrosis	Nephritis, nephrotic syndrome, and nephrosis	Nephritis, nephrotic syndrome, and nephrosis	Chronic liver disease and cirrhosis	Chronic liver disease and cirrhosis	Chronic liver disease and cirrhosis	Chronic liver disease and cirrhosis	Nephritis, nephrotic syndrome, and nephrosis	Nephritis, nephrotic syndrome, and nephrosis	Chronic liver disease and cirrhosis

Source: [219]

7.2 Strengthening health literacy

Health literacy is well understood to be interconnected with health equity and to be an important determinant of health, although recent data are not available [220]. Health literacy is best achieved when efforts begin in childhood. High literacy in children could result in a 1% increase in literacy for adults, thus yielding a 3% increase in GDP per capita, because higher literacy correlates with higher paying jobs and better health outcomes, and decreased social spending [221,222]. An example of a promising health literacy education for older children and young adults is The Indigenous Story Studio, a non-profit organization in British Columbia that specializes in creating culturally relevant and engaging health and social issue education through animation, comic books, and virtual reality [220]. Any efforts to support health literacy and improved health outcomes for Indigenous persons must be directly informed (and ideally, led) by Indigenous communities, and use Indigenous definitions and concepts of health and wellness [223].

7.3 Strategies to address structural determinants of health

Despite several reports and frameworks from government, non-profit groups, and researchers, highlighting the importance of addressing the structural determinants of health (SDH) over the past few decades, little has been achieved in actions or reduction of inequities experienced by Canadians [224–231]. Although the effects of SDH on health are clear, resolving health inequities requires joint policy decisions that are beyond the purview of health ministries [224],

SDH include policies affecting living and working conditions, affordability of essential goods, and wages. They are universally understood to have more significant impact on the health of general populations and the health inequities experienced [208]. The conditions of childhood (including prenatal events), particularly poverty, significantly influence the trajectory of adult lives (i.e., financial and housing security, wage earning potential, literacy, etc.) [232]. Federal policies have been recently strengthened to enhance child health in the form of the Child Care Benefit (implemented in 2016), which offers financial support to families earning between \$50,000 and \$130,000. More support is provided to those at the lower end of this spectrum. Research on the effectiveness of this income support policy is limited, but one recent study has reported that the incidence of poverty declined 11% and almost 17% for single-mother and two-parent families, respectively, in the 2 years after implementation of the child care benefit [233].

Canada is outperformed by comparable OECD countries regarding several key indicators of SDH [224]. Importantly, the United Nations has described that poverty, housing insecurity, income insecurity, and the discrimination against Indigenous people and women have been unaddressed in Canada [208,209].

Overall, federal initiatives to address SDH appear to have had limited effects. The federal government's attention, to date, has focused on the development of health inequality indicators; implementation of structures to strengthen the public health system; inter-sectoral action on the SDH; and the provision of funding to address key inequalities (e.g., early child development, racism, and determinants of health for Indigenous people) [234]. A recent review has found that a meaningful Health in All Policies program adopting a whole-government approach towards improving population health and addressing SDH is lacking, and the federal government has not performed a systematic and comprehensive review of its social programs for several decades [235]. Various commissions and committees at the federal level examine issues on a sector-by-sector basis; consequently, health-focused reviews routinely ignore relevant social programs, such as old-age pensions or employment insurance. Furthermore, efforts to overcome the longstanding structural inequities affecting the health and wellbeing of Indigenous Peoples have been slow and require urgent, sustained action and a deliberate shift towards Indigenous self-determination.

7.4 Recommendations

RECOMMENDATION 6A

Expand the number and scope of national longitudinal surveys to better understand and evaluate interventions aimed at improving health and its determinants.

RECOMMENDATION 6B

Meaningfully improve the structural determinants of health, prioritizing early childhood experiences (e.g., eliminating child poverty through targeted cash transfers).

RECOMMENDATION 6C

Combat systemic discrimination and racism in the health system, such as by supporting health workforce education and recruitment from racialized populations, and providing widespread access to cultural safety and anti-racism training to all health sector workers (e.g., providers, system managers).

RECOMMENDATION 6D

Work with and support Indigenous communities, and take FPT action to address the specific and structural social, economic, and health inequities faced by Indigenous communities.

8. DOMAIN 7

Environmental sustainability



The Government of Canada committed to delivering a climate resilient, low carbon and sustainable health system as part of the COP26 Health Programme in November 2021 [236]. This commitment was the first action by the federal government to incorporate the health sector in its efforts to transition to a low carbon economy. Of note, a wider range of environmental sustainability considerations arose, such as increased waste from increased PPE use, among many others, although this report focuses on climate change issues and impacts. As part of longstanding efforts to monitor and decrease greenhouse gas (GHG) emissions from large industrial emitters, the federal government implemented a Greenhouse Gas Reporting Program in 2004; some large hospital systems meet the thresholds for reporting through these programs [237]. In 2018, the federal government introduced the *Greenhouse Gas Pollution Pricing Act*, which aims to set a minimum carbon tax for all large industrial emitters across the country. The program applies to provinces that do not implement a carbon pollution price or a cap-and-trade system that meets the minimum requirements of the federal program [238]. As with the GHG reporting program, some large hospitals meet the thresholds for carbon pricing through this program.

In efforts to measure and reduce the GHG and broader environmental impacts of health care, federal programs are limited by their high thresholds, which include only the largest emitters, and their limited scope, with a focus on directly controlled emissions that excludes most of the environmental impacts of health care, which arise from the supply chain.

Because Canada is a decentralized federation, most of the efforts to measure and minimize the environmental impacts of health care are led by provinces, although efforts markedly vary across the country. The province of British Columbia has the most developed requirements, which stem from climate change legislation dating from the early 2000s [239]. Legislation in British Columbia is not specific to health care; instead, it targets industry and the broader public sector with emissions reduction and pricing requirements, as well as ambitious infrastructure standards. Beginning in 2019, the Ministry of Health incorporated the provincial commitment to climate change in its mandate letters to the province's health authorities [240], thus moving towards embedding environmental commitments within health policy expectations. British Columbia's climate legislation is more ambitious than the federal legislation, with a higher price per tonne of carbon dioxide equivalent emissions and lower thresholds for eligible institutions. However, British Columbia has also focused on directly controlled emissions, thus excluding the supply chain.

Importantly, some emissions from health care are easily estimated in Canada and worldwide. Specifically, facilities managers can estimate most scope 1 emissions (on-site or owned equipment burning of fossil fuels, e.g., natural gas and diesel) and scope 2 emissions (emissions from burning fossil fuels to generate purchased electricity and, to a lesser extent, steam) by measuring fossil fuel use and electricity/steam purchasing and applying relevant conversion factors. Most health care emissions are not included in these measures and are not routinely estimated in Canada or worldwide.

In Canada, the full life cycle of environmental emissions from health care (i.e., including GHG and other emissions, across the full life cycle from resource extraction to disposal, which is the relevant standard) has been estimated with high level 'top down' methods by researchers [241,242]. These estimates are insufficiently granular to guide action. However, considerable potential exists to decrease emissions through established change strategies associated with appropriate care and resource stewardship, and through imposing requirements on vendors selling products and services to the health system.

A host of regulations govern waste. Most health care waste is akin to household waste and is subject to provincial and municipal regulations, guidelines, and bylaws. Hazardous medical waste – including biomedical waste that carries the risk of infection, and pharmaceutical waste that is toxic to the environment – is subject to a patchwork of provincial regulations and guidelines.

Work associated with climate resilience for health and health systems is longstanding in Canada. The Climate Change and Innovation Bureau in the Safe Environments Program within Health Canada houses world leading experts on health system resilience, with a focus on public health action and facilities. The Government of Canada committed to developing Canada's first National Adaptation Strategy in 2020, and Health Canada is currently leading the Health and Wellbeing work as part of this national effort [243]. Beyond initiatives by the federal government, several provincial and municipal governments have initiated climate resilience work, which typically pays attention to health impacts and the role of public health in anticipating and mitigating localized health harms. Again, British Columbia leads the country in preparedness.

Within health systems, considerable work is also underway to advance environmental sustainability. One recent national initiative funded by Environment and Climate Change Canada, CASCADES, is providing evidence-based guidelines and capacity building activities to support the health care community to transition towards a "sustainable (net-zero, resilient) health system" [244].

8.1 Recommendations

RECOMMENDATION 7A

Support efforts to build knowledge, capacity, and networks to spread and scale disparate climate resiliency and sustainability efforts across health systems in Canada, e.g., building on existing networks such as Creating a Sustainable Canadian Health System in a Climate Crisis, and the Canadian Coalition for Green Health Care.

RECOMMENDATION 7B

Produce and publicly report consistent, robust, and actionable baseline data across the country on the environmental impacts of health systems.

9. CASE STUDY 1
**Long-term
care**



Context

LTC facilities in Canada experienced relatively high excess mortality and infection rates compared with those in similar OECD countries during the COVID-19 pandemic [26,83,245]. Outcomes for older people in LTC homes were poor across all provinces. In Ontario and Quebec, the Canadian military was called to support 5 and 24 homes, respectively, owing to short staffing and uncontrolled virus transmission, and reports of abandonment, abuse, and unhygienic living conditions [83,246–248]. Several audits, commissions, and inquiries were launched as facility-based LTC were understood to have failed Canada's most vulnerable people [39,83,108,110,158,249–251]. Although the debate regarding how to best care for Canada's aging population is not new, the crisis of COVID-19 has reignited public and government awareness after many years of government inaction. Researchers and thought leaders have spent the past two decades calling for a continuum of care options for older people [252–254], yet institutional LTC remains central to government reform agendas [83,161,255].

Goal

This case study explores the LTC home crisis during the COVID-19 pandemic and how the current LTC system (home and residential) requires urgent attention to strengthen health system sustainability and resilience. We focus on general trends and observations across Canada; specific PT initiatives and reform plans are beyond the scope of this case study.

Relevant Domains

- Domain 3: Workforce
- Domain 5: Service delivery

The Case

LTC (including residential and home care) services in Canada are not included in the essential benefits package, which is limited to hospital and physician/medical services. Although variability exists in the delivery and coverage of LTC services across Canada, PTs generally over-rely on the 'warehousing' of older adults with LTC needs in institutions [256], and for decades, the demand has exceeded the available supply [39,252]. Alternative care options for aging Canadians, such as home and community care supports, have been historically starved of meaningful investment, including a lack of support for informal caregivers (family and friends) wishing to sustain their loved ones at home [152,161]. With few options available to aging Canadians, LTC facilities are chronically at capacity [39,257,258], with waitlists as long as 5 years in some areas [259]. Further health system congestion is experienced in the senior care pipeline in the form of ALC beds in hospitals; this term is used to describe inpatients who do not require hospital services but cannot go elsewhere to meet their care needs. ALC beds are often the result of insufficient care options and support for older people and their families, because older Canadians are brought to hospitals when their families are unable to sustain them at home any longer. The beds are not pre-allocated for this purpose but are typically the last resort option for families [152,260]. To some extent, patients in ALC beds have priority access to LTC beds after they become available [260].

Analysis

Residential LTC in Canada is delivered by a combination of public, private for-profit, and private not-for-profit facilities. The growing demand for care options for Canada's increasingly aging population has seen a corresponding growth in the for-profit model since the 1990s [252], both for LTC homes regulated and partially funded by government, and for fully private pay retirement homes. Funding of LTC institutions comes from a combination of public (taxation) and private (fees for accommodation). Publicly funded LTC beds are historically designated for older adults who require

comprehensive 24/7 care [261]; less clinically intensive options have been offered in the form of retirement homes, wherein residents (or their families) pay as much as \$7,000 per month for a room and meals, and have the option of paying into tiered support packages for residents with higher needs [252]. Much of the for-profit sector is owned by large financial firms; the number of holdings for financial firms has doubled between 2003 and 2020. Thirty-three percent of older peoples' housing in 2020 was held by financial firms, accounting for an estimated 42% of retirement home rooms and almost one-quarter of LTC beds [252]. Some studies have found poorer quality of care among corporate-owned LTC homes, thus raising concerns regarding this trend towards privatization [261–263].

A recurring criticism over the years, as highlighted in inquiries spurred by the pandemic and mortality rates among LTC residents, is that the infrastructure in place to house older people under care is outdated and inadequate [264]. Many of Canada's LTC homes were built between 1950 and 1990. These homes were modelled after hospitals and have ward-style rooms, communal dining areas and bathrooms, and narrow shared spaces for staff. Therefore the architectural design was not optimized to withstand outbreaks or facilitate isolation of infected residents [83]. The poor quality in LTC homes also relates to workforce and staffing challenges.

The LTC crisis during COVID-19 has been attributed to several interrelated workforce issues. These include the inadequate supply of regulated providers (i.e., nurses, in-house physicians, and allied health providers), and the corresponding shift in direct care provision to unregulated support workers [83,96,258]. Additional problems are associated with inadequate infection prevention training, lack of emergency PPE stockpiles [24,39], and the dependence on informal caregivers to bridge gaps in care [82]. Notably, in Ontario, when informal caregivers were restricted from entering LTC homes, supplies of caregivers were insufficient to meet the needs of residents [39,83,264]. Although this sector is highly regulated, shortcomings in the current regulations have enabled ongoing poor quality and adverse outcomes to persist. Current regulations do not specify workforce standards, working conditions [83], or resident quality of life [265]. Furthermore, inspections are not performed routinely. For example, in 2018, only nine of the more than 600 care homes in Ontario were assessed [258]. Owing to the imbalance between supply and demand, limited options exist to reprimand non-compliant facilities, because their closure would affect the care of vulnerable residents and create a cascade of disruptions in other components of the health sector [39,258].

The workforce that sustains institutionalized LTC has higher turnover than that among other workers in the health system. More than 90% of direct care is provided by unregulated support workers, who make up the lowest echelon of the health workforce hierarchy, and routinely receive low wages and lack access to full-time employment and benefits. This group is also predominantly female and racialized [83]. High turnover has been attributed to burnout [266], low wages [257,264], high risk of job dissatisfaction, poor mental health and physical health, and workplace violence [81,96,258]. Projections based on trends in demand and supply suggest that the number of support workers is insufficient to sustain current and future needs [254].

Research indicates that the increasingly complex health needs of Canada's aging population demand an interdisciplinary and coordinated approach to care to ensure high quality and dignified support. This approach requires the services from specialized teams of physical therapists, palliative care specialists, recreation therapists, social work, pastoral care, dieticians, occupational therapists, psychiatrists, hearing specialists, and speech language therapists; yet, these services fall outside the scope of the PT universal health coverage programs and are therefore not typically accessible to LTC residents or home care recipients [83]. Unregulated support workers alone are not equipped, or sufficiently compensated, to meet the needs of older people.

Numerous recommendations for strengthening LTC systems in Canada have been made over the past two decades from government sponsors, professional organizations, and experts alike [158,264,265,267]. One longitudinal review spanning 1998–2020 has found 80 reports and more than \$23.5 million spent on research into improving LTC facilities, all calling for more adequate

staffing and more realistic investments in the sector [268]. In addition to the calls for strengthening quality and accessibility of LTC in residential settings, longstanding concerns exist regarding inadequate LTC in the home (home care). Notably, most older adults prefer to age in place, yet funding for home care is inadequate to meet their needs [258].

Compared with similar OECD countries, Canada has 4.7 fewer caregivers per 100 Canadians [254], and it spends less on the care of older adults; this spending has remained consistent at 1.3% of GDP, compared with 1.7% in comparable OECD countries as of 2017 [256]. The public spotlight on sub-par living conditions and poor quality of care in LTC facilities has led to outrage among Canadians regarding the treatment of older people. Older people overwhelmingly indicate they want to avoid LTC homes and would like to see the government subsidize more home care options [255], because many Canadians routinely have unmet home care needs, particularly through the public system [254,265]. Although the government has had decades to intervene, public pressure and the pan-Canadian failures in LTC homes are increasingly difficult to ignore.

Governments across Canada have signalled an increased interest in addressing some of these longstanding challenges in LTC. The federal government has earmarked \$3 billion over a 3-year period to help PTs ensure that LTC facilities adhere to standards [269]. At the provincial level, the Ontario government has promised to invest \$4.9 billion over a 4-year period to increase access to care, including \$673 million for recruitment and retention to increase direct care hours from 2.5 hours per day to 4 hours per day by 2024. This funding does not stipulate how accountability among LTC operators will be ensured, but it indicates that the standard duration of care would be protected by the *Fixing Long-Term Care Act, 2021* [270]. Ontario's LTC staffing plan, released in December 2020, acknowledges the need to facilitate access to full-time employment among LTC workers, additional training and, although vaguely, indicates that working conditions must be improved; however, the specifics of these plans are limited and are likely to be insufficient for addressing the shortages and high turnover that have occurred to date [271]. In Ontario and across Canada, provinces are allocating funds for new construction of LTC homes and additional beds in existing LTC facilities [272–276]. Generally, these plans fail to consider alternative care options to LTC homes, such as home and community care. In addition, concerns exist that focussing on development and enforcement of standards will not be sufficient to make the needed improvements to quality in LTC homes [83,258,277,278].

Key Findings

- Previous recommendations for the LTC sector are lacking implementation.
- LTC (residential and home care) service offerings are highly varied among PTs. Canada's first-line response of warehousing older people as a primary means of caring for older adults has created a bottleneck in senior care, wherein the need for residential care exceeds supply and alternative care arrangements; i.e., home and community care are not equitably available to decrease the demand for residential care. This inefficiency blocks hospital beds (i.e., ALC patients) and results in inappropriate admission to residential LTC.
- Canada has insufficient support workers to meet current demands.
- Canada has fewer caregivers and spends less on older people than similar OECD countries. Although the sector is regulated, the channels for reprimanding low quality service and infractions are severely limited.

Renewed efforts are being made to enhance federal and PT funding for LTC beds, yet these measures are likely to be insufficient. Increases in funding are needed to invest in a continuum of care services for older people.

10. CASE STUDY 2
COVID-19
vaccines in
Canada



Context

Since the start of the COVID-19 pandemic in early 2020, the development and distribution of vaccines has become a major priority for pharmaceutical companies and governments worldwide. In Canada, the distribution of vaccines began after regulatory approval of the Pfizer-BioNTech and Moderna vaccines on 9 and 23 December 2020, respectively, which were closely followed by approval of the AstraZeneca (26 February 2021) and Janssen (5 March 2021) vaccines. Vaccination began in late December 2020, starting with vulnerable populations, such as older people; federal inmates; health-care workers; and First Nations, Inuit, and Métis populations.

As of 14 August 2022, 82% of all Canadians had completed their primary series of COVID-19 vaccinations, and almost half of the country had received at least one booster dose [279], thus making Canada a global leader in vaccination rates (Figure 1) [149]. Despite this progress, disparities in vaccination uptake exist within the country. Some communities and provinces have experienced slower rates of uptake than others. Given that some jurisdictions discarded excess doses of COVID-19 vaccine because of low uptake [280,281], this disparity cannot necessarily be attributed to differential access to vaccines.

Goal

The aim of this case study is to explore barriers and facilitators of vaccine uptake. We describe overall procurement and distribution efforts by the federal government, as well as PT-level approaches to vaccine distribution and awareness campaigns. In addition, we briefly review several factors affecting differential uptake by socioeconomic groups, and some current research on vaccine confidence and uptake.

Relevant domains

- Domain 4: Medicines and technologies
- Domain 5: Service delivery
- Domain 6: Population health and social determinants

The Case

Vaccination of Canadians against COVID-19 and its variants has been a coordinated, intergovernmental effort, and many levels of government and stakeholders have determined the attributes of the vaccine rollout. The federal government is responsible for the approval, procurement, and disbursement of vaccines to PTs. On the basis of Canada's initial purchase agreements with AstraZeneca, Moderna and Pfizer-Biontech, by January 2021, 76 million doses had been secured [282]. The disbursement of doses to individual PTs is coordinated by PHAC, and is based on provincial and territorially provided estimates of the number of vaccines needed to cover eligible populations [283].

After vaccines are distributed, PTs are responsible for allocating doses and administering vaccines. Consequently, vaccine rollout has not been uniform across the country³. For example, some provinces offered priority access to COVID-19 'hotspots' that had higher case numbers during the

3. A series of PT vaccination rollout reports can be found online by the Coronavirus Variants Rapid Response Network (CoVaRR-Net) and the North American Observatory on Health Systems and Policies. These reports, which will be completed for all PTs, describe the vaccination policy programs including governance, underlying principles, prioritization of population groups, efforts to ensure access, public communication strategies, and actions to establish sufficient infrastructure and health work capacity. <https://naohealthobservatory.ca/grant-comparative-policy-research-projects/covid-19-vaccination-rollout>

early days of vaccine distribution, whereas others offered financial incentives to encourage vaccination [284]. Social media and other mass communication channels have been used prominently in many provinces, both to update the public on the state of the pandemic and vaccine rollout, and to advertise the availability of vaccines.

Vaccine hesitancy is a factor affecting vaccination [285], as are personal risk perception and the fear of being stigmatized in social situations for being either vaccinated or unvaccinated [286]. Canadians also are influenced by federal and provincial policies that incentivize vaccination – both directly (such as through lottery campaigns) and indirectly (such as through vaccine passports for travel and indoor gatherings) [284].

Analysis

Although overall levels of vaccination against COVID-19 are high in Canada, the levels of vaccine coverage vary across the country. In Newfoundland and Labrador, more than 92% of the population has received a full two-dose series of vaccinations, as compared with 74% in Nunavut, and 77% in the Northwest Territories, Alberta, and Saskatchewan [279]. Vaccination rates appear to be modestly higher among women, although the difference is indistinguishable among those younger than 18 and older than 80 years of age [279]. Findings from the 2021/2022 Canadian Community Health Survey suggest that the proportion of individuals with at least one dose is lower among individuals who self-identify as off-reserve First Nations (81%), Black (82%), or Arab (85%), and higher among those who self-identify as South Asian (96%) [287]. The differences between PTs may relate partly to the differences in vaccine rollout approaches, including whether to provide a central booking system and to allow for flexible delivery strategies including multiple access points with low-barrier options. Moreover, variations across population groups are expected, given the systematic barriers to vaccine uptake that differentially affect racialized and lower-income communities.

For remote and rural areas, vaccine rollout has necessarily relied on large vaccination clinics to administer as many vaccinations as possible to community members as possible in a short period of time. In the northern territory of Nunavut, this strategy is dependent on weather and the availability of charter planes to deliver vaccines to fly-in communities [288]. Nunavut and the other northern territories (Yukon and the Northwest Territories) additionally faced early barriers to vaccine rollout in the early stages when Canada's access to Moderna vaccines was disrupted by manufacturing issues in February 2021. At that time, Moderna was the only vaccine to be distributed in the north of the country [289].

Having access to a supportive community environment can be an important factor in increasing individual-level vaccine awareness and education. Key informant interviews conducted by the National Collaborating Centre for Determinants of Health have indicated that Black leadership is a critical component to increasing vaccine familiarity in Black communities [290]. Some successful examples of community-driven efforts have included pop-up clinics in Toronto, with models focusing on lowering individual-level barriers, such as offering expanded hours, offering vaccines to undocumented people, creating a culturally safe environment with multiple language options, and offering walk-in appointments [290]. A wide range of innovative initiatives that leveraged existing or developed new partnerships between public health authorities and community organizations were seen across Canada to overcome structural barriers to access and promote vaccine confidence in racialized and marginalized communities.

Experiences of success in lowering barriers to access have not been uniform. Other reports from Ontario suggest that the initiative to increase vaccine access through community pharmacies was disproportionately representative of wealthy areas rather than areas at greater risk of spread [291]. Similarly, in British Columbia, pharmacies that were initially approved to administer vaccines were limited to those in the Vancouver Coastal Health and Fraser Health Authorities, which cover only the metropolitan areas of the province's largest city, Vancouver. In other parts of the country, owing to process-associated barriers, for example in Nova Scotia, booking a vaccine appointment

preferentially favoured individuals with Nova Scotia health cards. Unlike seasonal flu shots, which are usually provided in pharmacies on a walk-in basis, or in doctor's offices, the initially limited supply of COVID-19 vaccines required a more structured rollout. The reliance on grassroots initiatives such as VaccineHunters in Ontario, for people to find locations where they could book or access the vaccines, suggest the failure by governments to ensure a smooth, clear, and convenient rollout.

Many possible reasons may explain why individuals with similar access to vaccines may be less likely to seek vaccination, such as vaccine hesitancy caused by mistrust in the health care system. Vaccine hesitancy is more prominent among Black Canadians and non-Black visible minorities, for example, than among white Canadians [292]. Additionally, young individuals with lower education and income levels are also relatively more likely to be vaccine hesitant [285]. Survey findings suggest that younger adults are less likely to perceive a high risk of contracting COVID-19, given the accumulated data demonstrating that younger people are at lower risk of hospitalization and disease complications [285,286,293]. Evidence suggests that these structural barriers have not been effectively addressed in some communities, particularly among First Nations, Inuit, and Métis peoples. Despite specific government programs to prioritize these groups to receive vaccines, uptake rates in two Ontario cities have been shown to be lower among Indigenous communities than the general population [294].

Key findings

Canada's vaccine procurement strategy relied on the receipt of shipments of vaccines from foreign manufacturers; however, disruptions in the supply of the Moderna vaccine from Belgium early in the rollout prompted calls to action by the public for more Canadian-manufactured vaccines [295].

Despite some successful efforts to lower barriers to vaccination for racialized and lower income communities in Canada, systemic racism and intergenerational trauma remain major factors contributing to general mistrust in Canada's health care system.

11. Acknowledgements



We are grateful to Shinjini Mondal, for supporting the literature review and for preliminary writing; Esther Davies, for supporting the literature review; and the stakeholders interviewed as part of this work.

Expert Panel Members

- Helen Angus (Former Deputy Minister of Health and Long Term Care, Ontario)
- Adalsteinn (Steini) Brown (Dean, Dalla Lana School of Public Health, University of Toronto)
- Jennifer Gibson (Chair and Director, Joint Centre for Bioethics and Associate Professor, University of Toronto)
- Antoine Groulx (Directeur Scientifique, Unité de soutien SSA Québec; Professor, Faculté de médecine, Université Laval)
- Maria Judd (Vice President, Strategic Initiatives & Engagement, Healthcare Excellence Canada)
- Amélie Quesnel-Vallée (Professor and Canada Research Chair in Policies and Health Inequalities; Director, McGill Observatory on Health and Social Services Reforms)
- Stephen Samis (Former Deputy Minister, Health and Social Services, Government of Yukon)
- Marcel Saulnier (Consultant, Santis Health; Former Associate Assistant Deputy Minister of the Strategic Branch, Health Canada)
- Katharine Smart (President, Canadian Medical Association)
- Mark Stabile (Stone Chaired Professor of Wealth Inequality and Professor of Economics at INSEAD and Professor, University of Toronto)
- Bryce Stewart (Associate Deputy Minister, Health, Government of Alberta)
- Jonathan Veale (Chief Design Officer, Nova Scotia Department of Health and Wellness)
- Jim Wright (Executive Vice President, Economics, Policy & Research, Ontario Medical Association)

12. References



- [1] Health Canada. Canada's Health Care System 2019. www.canada.ca/en/health-canada/services/health-care-system/reports-publications/health-care-system/canada.html (accessed December 7, 2021).
- [2] Marchildon G, Allin S, Merkur S. Canada: Health System Review 2020. vol. 22. 3rd ed. 2020.
- [3] Atkinson M, Marchildon G, Phillips P, Rasmussen K, Béland D, McNutt K. Governance and Public Policy in Canada: A View from the Provinces. Toronto: University of Toronto Press; 2013.
- [4] Canada. Intergovernmental relations in the Canadian context. Intergovernmental Affairs 2021. www.canada.ca/en/intergovernmental-affairs/services/reasons-canadian-context.html (accessed March 21, 2022).
- [5] Truth and Reconciliation Commission of Canada. Honouring the truth, reconciling for the future: summary of the final report of the Truth and Reconciliation Commission of Canada, Winnipeg, Manitoba: Truth and Reconciliation Commission of Canada; 2015.
- [6] Canada. Pan-Canadian Health Organization (PCHO) Implementation Steering Group – Terms of Reference. Health Canada Programs and Policy Development 2018. www.canada.ca/en/health-canada/programs/external-advisory-body-pan-canadian-health-organizations/implementation-steering-group-terms-reference.html (accessed March 22, 2022).
- [7] Canada. Canada Health Act Annual Report 2017-2018 2020. www.canada.ca/en/health-canada/services/publications/health-system-services/canada-health-act-annual-report-2017-2018.html (accessed March 23, 2022).
- [8] Forest P-G, Martin D. Fit for Purpose: Findings and Recommendations of the External Review of the Pan-Canadian Health Organizations. Health Canada; 2018.
- [9] Flood CM, Archibald T, Canadian Policy Research Networks. Hamstrung and Hogtied: Cascading Constraints on Citizen Governors in Medicare. 2005.
- [10] Ontario. Ontario Health Teams – Patient, Family and Caregiver Partnership and Engagement Strategy: Guidance Document 2021.
- [11] Assemblée Nationale du Quebec. Special consultations and public hearings on the Evolution of the Act respecting end-of-life care - National Assembly of Québec. Parliamentary Proceedings 2021. www.assnat.qc.ca/en/travaux-parlementaires/commissions/cssfv/mandats/Mandat-44835/index.html (accessed October 6, 2022).
- [12] Canada. What We Heard: A Renewed and Strengthened Public Health System in Canada 2021.
- [13] OECD. Building Trust to Reinforce Democracy: Main Findings from the 2021 OECD Survey on Drivers of Trust in Public Institutions. OECD; 2022. <https://doi.org/10.1787/b407f99c-en>.
- [14] Edelman Data & Intelligence. Edelman Trust Barometer 2020: Global Report. 2020.
- [15] Edelman Data & Intelligence. Edelman Trust Barometer 2022: Global Report. 2022.

- [16] Ipsos. Global Health Service Monitor 2021. Ipsos; 2021.
- [17] Statistics Canada. Crowdsourcing participants' trust in governments, public health authorities, businesses and others during the COVID-19 pandemic. 2020.
- [18] Postmedia, Leger. COVID-19 and Trust: a Postmedia – Leger Poll. 2021.
- [19] Health Canada. Learning from SARS: renewal of public health in Canada: a report of the National Advisory Committee on SARS and Public Health. Ottawa: National Advisory Committee on SARS and Public Health; 2003.
- [20] Canada. Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector 2018.
- [21] Canada. Federal, Provincial, Territorial Public Health Response Plan for Ongoing Management of COVID-19 2022.
- [22] McNeill R, Topping J. Federal, provincial and territorial public health response plan for biological events. *Canada Communicable Disease Report* 2018;44:1–5. <https://doi.org/10.14745/ccdr.v44i01a01>.
- [23] PHN. Special Advisory Committee on COVID-19 – Pan-Canadian Public Health Network. COVID-19 Response 2022. www.phn-rsp.ca/en/about/covid-19-response.html (accessed August 15, 2022).
- [24] Office of the Auditor General of Canada. Pandemic Preparedness, Surveillance, and Border Control Measures. Office of the Auditor General of Ontario; 2021.
- [25] Trudeau J. Prime Minister creates committee on COVID-19. Prime Minister of Canada 2020. <https://pm.gc.ca/en/news/news-releases/2020/03/04/prime-minister-creates-committee-covid-19> (accessed July 14, 2022).
- [26] Allin S, Fitzpatrick T, Marchildon G, Quesnel-Vallee A. The federal government and Canada's COVID-19 responses: from "we're ready, we're prepared" to "fires are burning." *Health Economics, Policy and Law* 2021;17:76–94. <https://doi.org/10.1017/S1744133121000220>.
- [27] PHAC. Canada's Response. COVID-19: Canada's Response 2022. www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse.html (accessed August 15, 2022).
- [28] Razak F, Shin S, Naylor CD, Slutsky AS. Canada's response to the initial 2 years of the COVID-19 pandemic: a comparison with peer countries. *CMAJ* 2022;194:E870–7. <https://doi.org/10.1503/cmaj.220316>.
- [29] Engzell P, Frey A, Verhagen MD. Learning loss due to school closures during the COVID-19 pandemic. *Proceedings of the National Academy of Sciences* 2021;118:e2022376118. <https://doi.org/10.1073/pnas.2022376118>.
- [30] Hammerstein S, König C, Dreisörner T, Frey A. Effects of COVID-19-Related School Closures on Student Achievement-A Systematic Review. *Frontiers in Psychology* 2021;12.
- [31] Allen U, Collins T, Dei GJS, Henry F, Ibrahim A, James C, et al. Impacts of COVID-19 in Racialized Communities. *Royal Society of Canada*; 2021. <https://doi.org/10.14288/1.0398437>.
- [32] PHAC. From risk to resilience: An equity approach to COVID-19: The Chief Public Health Officer of Canada's Report on the State of Public Health in Canada 2020. Ottawa, ON: Public Health Agency of Canada; 2020.

- [33] PHAC. Social inequalities in COVID-19 mortality in Canada, 2020. Public Health Agency of Canada; 2021.
- [34] Royal Society of Canada. Executive Summary: Excess All-Cause Mortality During the COVID-19 Epidemic in Canada 2021.
- [35] NCCMT. What is known about the response of the Public Health Network and Special Advisory Committee in Canada to the COVID-19 pandemic? National Collaborating Centre for Infectious Diseases; 2022.
- [36] Berry I, Brown KA, Buchan SA, Hohenadel K, Kwong JC, Patel S, et al. A better normal in Canada will need a better detection system for emerging and re-emerging respiratory pathogens. *CMAJ* 2022;194:E1250–4. <https://doi.org/10.1503/cmaj.220577>.
- [37] Canadian Public Health Association. Canada's Initial Response to the COVID-19 Pandemic: A Review. Ottawa, ON: 2021.
- [38] PHPC. Public Health Lessons Learned from the COVID-19 Pandemic. Public Health Physicians of Canada; 2022.
- [39] Marrocco F, Coke A, Kitts J. Ontario's Long-Term Care COVID-19 Commission: Final Report. Toronto: 2021.
- [40] CSBE. Mandate to Assess the Performance of Care and Services for Older Adults - COVID-19: The Duty to Do Things Differently. Government of Quebec; 2022.
- [41] Loewen P. Report 6: Three Areas in Which Pandemic Management Could Have Been Better. Public Policy Forum 2021. <https://ppforum.ca/publications/three-areas-in-which-pandemic-management-could-have-been-better> (accessed December 7, 2021).
- [42] Barnabe C, Montesanti S, Sarin C, White T, Bartel R, Henderson R, et al. Propelled by the Pandemic: Responses and Shifts in Primary Healthcare Models for Indigenous Peoples. *Healthcare Policy* 2022;17.
- [43] Mashford-Pringle A, Skura C, Stutz S, Yohathasan T. Supplementary Report for the Chief Public Health Officer of Canada's Report on the State of Public Health in Canada. 2021.
- [44] Office of the Chief Science Advisor. Ongoing initiatives on COVID-19. Office of the Chief Science Advisor 2021. www.ic.gc.ca/eic/site/063.nsf/eng/h_98027.html (accessed March 23, 2022).
- [45] Bhatia D, Allin S, Di Ruggiero E. Mobilization of science advice by the Canadian federal government to support the COVID-19 pandemic response 2022.
- [46] Institutionalizing Science Advising in Canada: Improving the Logic of Expectations. 2021.
- [47] Expert Advisory Group. Pan-Canadian Health Data Strategy: Building Canada's Health Data Foundation. Public Health Agency of Canada; 2021.
- [48] Expert Advisory Group. Pan-Canadian Health Data Strategy: Toward a world-class health data system. Public Health Agency of Canada; 2022.
- [49] CIHI. National Health Expenditure Trends. Canadian Institute for Health Information 2021. www.cihi.ca/en/national-health-expenditure-trends (accessed May 12, 2022).
- [50] Ontario. Chapter 4: Borrowing and Managing Debt 2021.

- [51] Canada. Annual Financial Report of the Government of Canada Fiscal Year 2020-2021. Department of Finance 2021. www.canada.ca/en/department-finance/services/publications/annual-financial-report/2021/report.html (accessed May 12, 2022).
- [52] Statistics Canada. Consolidated Canadian Government Finance Statistics, 2020. The Daily 2021. www150.statcan.gc.ca/n1/daily-quotidien/211122/dq211122a-eng.htm (accessed May 12, 2022).
- [53] MacPhee S, Cléophat R, Kho A, Nicol C. Fiscal Sustainability Report 2022. Office of the Parliamentary Budget Officer; 2022.
- [54] Mou H. WHAT NOW? | Canada Health Transfer: Background and future. Canada West Foundation; 2021.
- [55] Conference Board of Canada. Health Care Cost Drivers in Canada: Pre-and Post-COVID-19. Conference Board of Canada; 2020.
- [56] The Council of the Federation. Health care costs are on the rise in Canada and COVID-19 is a new cost driver. Canada's Premiers 2020. www.canadaspremiers.ca/health-care-costs-are-on-the-rise-in-canada-and-covid-19-is-a-new-cost-driver (accessed May 12, 2022).
- [57] Edmonds S, Hajizadeh M. Assessing progressivity and catastrophic effect of out-of-pocket payments for healthcare in Canada: 2010–2015. *The European Journal of Health Economics* 2019;20:1001–11.
- [58] Wagstaff A, Van Doorslaer E, Paci P. Equity in the Finance and Delivery of Health Care: Some Tentative Cross-Country Comparisons. *Oxford Review of Economic Policy* 1989;5:89–112.
- [59] Hurley J, Emmanuel Guindon G. Private health insurance in Canada. In: Thomson S, Sagan A, Mossialos E, editors. *Private Health Insurance: History, Politics and Performance*. 1st ed., Cambridge University Press; 2020, p. 99–141. <https://doi.org/10.1017/9781139026468.004>.
- [60] Adams NS and J. The Sustainability of Canada's Healthcare System: A Framework for Advancing the Debate. *Healthcare Quarterly* 2007;10.
- [61] Ammi M, Arpin E, Allin S. Interpreting forty-three-year trends of expenditures on public health in Canada: Long-run trends, temporal periods, and data differences. *Health Policy* 2021;125:1557–64. <https://doi.org/10.1016/j.healthpol.2021.10.004>.
- [62] Sutherland J. Healthcare Funding Policies for Reducing Fragmentation and Improving Health Outcomes. *The School of Public Policy Publications* 2021;14. <https://doi.org/10.11575/sppp.v14i1.74017>.
- [63] Macdonald D. Federal and provincial government COVID-19 spending. Canadian Centre for Policy Alternatives; 2021.
- [64] Canada. COVID-19 Authorities and Expenditures. 2020/21 Expenditures by Agency and 2021/2022 Expenditures by Agency. GC InfoBase 2021. <https://open.canada.ca/data/en/dataset/9fa1da9a-8c0f-493e-b207-0cc95889823e>.
- [65] Statistics Canada. Job vacancies and average offered hourly wage by occupation (broad occupational category), quarterly, unadjusted for seasonality. Data 2022. www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410035601 (accessed May 14, 2022).
- [66] Statistics Canada. Consumer Price Index, monthly, not seasonally adjusted. 2022.
- [67] OECD. Health at a Glance 2021: OECD Indicators. Paris: Organisation for Economic Co-operation and Development; 2021.

- [68] CIHI. Supply, Distribution and Migration of Physicians in Canada, 2020 - Historical Data. Ottawa, ON: 2021.
- [69] CIHI. Nursing in Canada, 2020 Data Tables. Canadian Institute for Health Information 2021. <https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.cihi.ca%2Fsites%2Fdefault%2Ffiles%2Fdocument%2Fnursing-in-canada-2011-2020-data-tables-en.xlsx&wdOrigin=BROWSELINK> (accessed May 14, 2022).
- [70] Westoll N. What is Bill 124 and how is it affecting Ontario's nurses, public-sector workers? CityNews Toronto 2021.
- [71] Statistics Canada. Job vacancies, first quarter 2022. The Daily 2022. www150.statcan.gc.ca/n1/daily-quotidien/220621/dq220621b-eng.htm (accessed September 6, 2022).
- [72] Malko A, Huckfeldt V. Physician Shortage in Canada: A Review of Contributing Factors. *Global Journal of Health Science* 2017;9:68. <https://doi.org/10.5539/gjhs.v9n9p68>.
- [73] College of Family Physicians of Canada. Family doctor shortage in Canada. News 2022. www.cfpc.ca/en/news-and-events/news-events/news-events/news-releases/2022/family-doctor-shortage-in-canada (accessed September 6, 2022).
- [74] McKeen A. Amid shortages of family doctors across Canada, med school grads increasingly don't want the jobs. *Toronto Star* 2022.
- [75] Hall L. Moving to Action: Evidence-Based Retention and Recruitment Policy Initiatives for Nursing. Canadian Foundation for Healthcare Improvement; 2013.
- [76] McGillis Hall L, Peterson J, Price S, Lalonde M, S M. Stemming the Flow of Canadian Nurse Migration to the US. *Canadian Journal of Nursing Leadership* 2013;26:8–19. <https://doi.org/10.12927/cjnl.2013.23246>.
- [77] Agrba L. The push to fill Canada's critical PSW shortage. *Macleans* 2021.
- [78] Bourgeault I, Simkin S, Chamberland-Rowe C. Poor health workforce planning is costly, risky and inequitable. *CMAJ* 2019;191:E1147–8. <https://doi.org/10.1503/cmaj.191241>.
- [79] CNA. Tested Solutions for Eliminating Canada's Registered Nurse Shortage 2009.
- [80] Ryan H. Low pay, a revolving door of workers and the push to improve home care in N.S. *CBC* 2022.
- [81] Bourgeault I. A Path to Improved Health Workforce Planning, Policy and Management in Canada: The Critical Co-Ordinating and Convening Roles for the Federal Government to Play in Addressing Eight Percent of its GDP. *The School of Public Policy Publications* 2021;14. <https://doi.org/10.11575/sppp.v14i1.74064>.
- [82] Estabrooks C. Staffing for Quality in Canadian Long-Term Care Homes. *HealthcarePapers* 2021;20.
- [83] Estabrooks C, Straus S, Flood C, Keefe J, Armstrong P, Boscart V, et al. Restoring Trust: COVID-19 and the future of long-term care. *Royal Society of Canada*; 2020.
- [84] The Royal Society of Canada. Investing in the Canadian Nursing Workforce Post Pandemic: A Call to Action - PREPRINT. *Royal Society of Canada*; 2022.
- [85] Health Canada. A 10-year Plan To Strengthen Health Care [Archived]. Ottawa, ON: Health Canada; 2004.

- [86] Tomblin-Murphy, G, Sampalli T, Bourque Bearskin L. Investing in Canada's Nursing Workforce Post-Pandemic: A Call to Action. Ottawa, ON: Royal Society of Canada; 2022.
- [87] Waddell K, Wilson M. Exploring Models for Health Workforce Planning. Hamilton: McMaster Health Forum; 2019.
- [88] Inside the home care crisis: Exposing a broken system. Marketplace 2022.
- [89] Smart K. Appearance before the House of Commons Standing Committee on Health: Study on Canada's Health Workforce 2022.
- [90] Royal College of Physicians and Surgeons of Canada. Employment Patterns of Canada's Newly Certified Medical Specialists: Findings from the Royal College Employment Study. Royal College of Physicians and Surgeons of Canada; 2019.
- [91] Wyonch R. Help Wanted: How to Address Labour Shortages in Healthcare and Improve Patient Access. C.D. Howe; 2021.
- [92] CIHI. Physicians in Canada, 2019. Ottawa, ON: Canadian Institute for Health Information; 2020.
- [93] CIHI. Physicians in Canada. Canadian Institute for Health Information 2021. www.cihi.ca/en/physicians-in-canada (accessed May 14, 2022).
- [94] Hedden L. Physicians and Surgeons. Introduction to the Health Workforce in Canada, Ottawa: 2021, p. 30.
- [95] CIHI. Scott's Medical Database metadata. Canadian Institute for Health Information n.d. www.cihi.ca/en/scotts-medical-database-metadata (accessed May 9, 2022).
- [96] Torres S, Parniak S, Kelly C. Community Health Workers and Personal Support Workers. Introduction to the Health Workforce in Canada. 1st ed., Ottawa: Canadian Health Workforce Network; 2021, p. 16.
- [97] Covell C, Sands SR. Nursing. Introduction to the Health Workforce in Canada, Ottawa: Canadian Health Workforce Network; 2021.
- [98] Alberta Health. Alberta Pandemic Influenza Plan 2014.
- [99] Government of Ontario. Ontario Health Plan for an Influenza Pandemic 2013 2013.
- [100] British Columbia. British Columbia Pandemic Provincial Coordination Plan 2020.
- [101] Tardif A, Gupta B, Feeney LM and W. Impact of the COVID-19 Pandemic on the Health Workforce in Canada. Healthcare Quarterly 2022;25.
- [102] Mihailescu M, Sim J, Bourgeault I. Afterword: The Impact of the COVID-19 Pandemic on the Canadian Health Workforce. Introduction to the Health Workforce in Canada, Ottawa: Canadian Health Workforce Network; 2021, p. 10.
- [103] Urrutia D, Manetti E, Williamson M, Lequy E. Overview of Canada's Answer to the COVID-19 Pandemic's First Wave (January–April 2020). International Journal of Environmental Research and Public Health 2021;18:7131. <https://doi.org/10.3390/ijerph18137131>.
- [104] Critical Care Education Pandemic Preparedness. Ontario Pandemic Response Resources. QuickICUTraining n.d. www.quickicutraining.com/ontario-pandemic-response-overview-of-md-tiers (accessed May 30, 2022).

- [105] Alami H, Lehoux P, Fleet R, Fortin J-P, Liu J, Attieh R, et al. How Can Health Systems Better Prepare for the Next Pandemic? Lessons Learned from the Management of COVID-19 in Quebec. *Frontiers in Public Health* 2021. <https://doi.org/10.3389/fpubh.2021.671833>.
- [106] Office of the Auditor General of Canada. COVID-19 pandemic: Pandemic preparedness, surveillance, and border control measures. 2021.
- [107] Office of the Auditor General of Canada. Securing personal protective equipment and medical devices. 2021.
- [108] Office of the Chief Science Advisor of Canada. Long-Term Care and COVID-19. Ottawa: Office of the Chief Science Advisor of Canada; 2020.
- [109] Bourgeault I. Canadians are concerned about the mental health of health workers; they should be. *The Hill Times* 2022. www.hilltimes.com/2022/04/25/canadians-are-concerned-about-the-mental-health-of-health-workers-they-should-be/357360 (accessed April 26, 2022).
- [110] Ernst and Young. BC Ministry of Health: Long-term care COVID-19 response review. 2020.
- [111] Ontario. Ontario Takes Extraordinary Steps to Ensure Health Care Resources are Available to Contain COVID-19. Newsroom 2020. <https://news.ontario.ca/en/release/56419/ontario-takes-extraordinary-steps-to-ensure-health-care-resources-are-available-to-contain-covid-19> (accessed April 6, 2022).
- [112] Zaidi D. Nurses more likely to quit in next 3 years, health worker survey finds. *CTV News* 2022.
- [113] Waters N, Leaver C. Views From the Front Line: Taking the Pulse of Canada's Healthcare Professionals. The Conference Board of Canada; 2021.
- [114] Deloitte. A struggling system: Understanding the health care impacts of the pandemic. Canadian Medical Association; 2021.
- [115] Statistics Canada. Experiences of health care workers during the COVID-19 pandemic, September to November 2021. *The Daily* 2022. www150.statcan.gc.ca/n1/daily-quotidien/220603/dq220603a-eng.htm (accessed June 9, 2022).
- [116] Canadian Medical Association. Canada's health system is on life support: Health workers call for urgent mobilization to address shortages, burnout and backlog issues. Canadian Medical Association 2022. www.cma.ca/news-releases-and-statements/canadas-health-system-life-support-health-workers-call-urgent, www.cma.ca/news-releases-and-statements/canadas-health-system-life-support-health-workers-call-urgent (accessed April 21, 2022).
- [117] Canadian Medical Association. Without health workers, there is no health care: Health care leaders call for urgent action at emergency COVID-19 summit. Canadian Medical Association 2021. www.cma.ca/news-releases-and-statements/without-health-workers-there-no-health-care-health-care-leaders-call, www.cma.ca/news-releases-and-statements/without-health-workers-there-no-health-care-health-care-leaders-call (accessed May 26, 2022).
- [118] Canadian Medical Association. Virtual Care: Recommendations for Scaling Up Virtual Medical Services. Canadian Medical Association; 2020.
- [119] CADTH. Reimbursement Review Reports. CADTH 2022. www.cadth.ca/reimbursement-review-reports (accessed June 10, 2022).
- [120] CADTH. Procedures for CADTH Reimbursement Reviews 2022.
- [121] Samuel N, Verma S. Cross-Comparison of Cancer Drug Approvals at Three International Regulatory Agencies. *Current Oncology* 2016;23:454–60. <https://doi.org/10.3747/co.23.2803>.

- [122] Shajarizadeh A, Hollis A. Delays in the submission of new drugs in Canada. *CMAJ* 2015;187:E47–51. <https://doi.org/10.1503/cmaj.130814>.
- [123] Ward L, Chambers A, Mechichi E, Wong-Rieger D, Campbell C. An international comparative analysis of public reimbursement of orphan drugs in Canadian provinces compared to European countries. *Orphanet J Rare Dis* 2022;17:113. <https://doi.org/10.1186/s13023-022-02260-6>.
- [124] Health Canada. Aligned reviews between Health Canada and health technology assessment organizations. Improving the Regulatory Review of Drugs and Devices 2018. www.canada.ca/en/health-canada/corporate/transparency/regulatory-transparency-and-openness/improving-review-drugs-devices/notice-aligned-reviews-health-canada-health-technology-assessment-organizations.html (accessed September 6, 2022).
- [125] Health Canada. Improving the regulatory review of drugs and devices. Regulatory Transparency and Openness 2020. www.canada.ca/en/health-canada/corporate/transparency/regulatory-transparency-and-openness/improving-review-drugs-devices.html (accessed August 19, 2022).
- [126] MacNeil M, Koch M, Kuspinar A, Juzwishin D, Lehoux P, Stolee P. Enabling health technology innovation in Canada: Barriers and facilitators in policy and regulatory processes. *Health Policy* 2019;123:203–14. <https://doi.org/10.1016/j.healthpol.2018.09.018>.
- [127] Stafinski T, Deber R, Rhainds M, Martin J, Noseworthy T, Bryan S, et al. The Introduction of New Non-Drug Health Technologies into Canadian Healthcare Institutions: Opportunities and Challenges. *Healthc Policy* 2019;15:95–106. <https://doi.org/10.12927/hcpol.2019.25935>.
- [128] Canada. Playing catch-up: where Canada stands three years into the pCPA–CGPA generics pricing initiative 2021.
- [129] PMPRB. Patented Medicine Prices Review Board: Annual Report 2019. Ottawa, ON: 2020.
- [130] CIHI. Increase in virtual care services provided by physicians. Canadian Institute for Health Information 2021. www.cihi.ca/en/health-workforce-in-canada-highlights-of-the-impact-of-covid-19/increase-in-virtual-care-services (accessed July 16, 2022).
- [131] Bhatia R, Jamieson T, Shaw J, Piovesan C, Kelley LT, Falk W, et al. Canada’s virtual care revolution: a framework for success. 2020.
- [132] Alberta Virtual Care Working Group. Optimizing Virtual Care in Alberta: Recommendations from the Alberta Virtual Care Working Group. Alberta Virtual Care Working Group; 2021.
- [133] Barbazza E, Allin S, Byrnes M, Foebel AD, Khan T, Sidhom P, et al. The current and potential uses of Electronic Medical Record (EMR) data for primary health care performance measurement in the Canadian context: a qualitative analysis. *BMC Health Serv Res* 2021;21:820. <https://doi.org/10.1186/s12913-021-06851-0>.
- [134] Naylor D, Girard F, Mintz JM, Fraser N, Jenkins T, Power C, et al. Unleashing innovation: excellent healthcare for Canada : report of the Advisory Panel on Healthcare Innovation. 2015.
- [135] Greiver M. Do electronic medical records improve quality of care?: No. *Canadian Family Physician* 2015;61:847–9.
- [136] Manca DP. Do electronic medical records improve quality of care? *Can Fam Physician* 2015;61:846–7.

- [137] Persaud N. A national electronic health record for primary care. *CMAJ* 2019;191:E28–9. <https://doi.org/10.1503/cmaj.181647>.
- [138] Larson D, Hutchinson S. *Re: Single EMR for Canada: A Second Opinion* 2019.
- [139] Office of the Auditor General of Ontario. *Value-for-Money Audit: Virtual Care: Use of Communication Technologies for Patient Care*. 2020.
- [140] Lexchin J. *Private profits versus public policy*. University of Toronto Press; 2016.
- [141] Byers-Lane B. *The critical role of biopharmaceuticals in Canadian health and economic growth: Laura Dawson for Inside Policy*. Macdonald-Laurier Institute 2016. <https://macdonaldlaurier.ca/the-critical-role-of-biopharmaceuticals-in-canadian-health-and-economic-growth-laura-dawson-for-inside-policy> (accessed October 7, 2022).
- [142] Fralick P. *Canada needs to renew its relationship with its pharmaceutical industry*. *Policy Options* 2021. <https://policyoptions.irpp.org/magazines/june-2021/canada-needs-to-renew-its-relationship-with-its-pharmaceutical-industry> (accessed October 7, 2022).
- [143] Blouw M. *Will Canada keep up globally on R&D?* *Policy Options* 2018. <https://policyoptions.irpp.org/magazines/april-2018/will-canada-keep-globally-rd> (accessed October 7, 2022).
- [144] Statistics Canada. *Total domestic expenditures on research and development (R&D) as percentage of gross domestic product (GDP), Canada and provinces, and G-7 countries 2022*. <https://doi.org/10.25318/2710035901-ENG>.
- [145] CIHI. *National Physician Database Historical Payments – Data Tables*. Ottawa, ON: 2021.
- [146] Health Canada. *The Critical Drug Reserve during COVID-19*. *COVID-19 Drugs and Vaccines 2021*. www.canada.ca/en/health-canada/services/drugs-health-products/covid19-industry/drugs-vaccines-treatments/critical-drug-reserve.html (accessed September 6, 2022).
- [147] Health Canada. *Health Canada expedites access to COVID-19 diagnostic laboratory test kits and other medical devices 2020*. www.canada.ca/en/health-canada/news/2020/03/health-canada-expedites-access-to-covid-19-diagnostic-laboratory-test-kits-and-other-medical-devices.html (accessed August 15, 2022).
- [148] North American Observatory on Health Systems and Policies. *North American COVID-19 Policy Response Monitor: Canada*. Toronto, ON: North American Observatory on Health Systems and Policies; 2021.
- [149] Mathieu E, Ritchie H, Ortiz-Ospina E, Roser M, Hasell J, Appel C, et al. *A global database of COVID-19 vaccinations*. *Nat Hum Behav* 2021;5:947–53. <https://doi.org/10.1038/s41562-021-01122-8>.
- [150] Berry I, O'Neill M, Sturrock SL, Wright JE, Acharya K, Brankston G, et al. *A sub-national real-time epidemiological and vaccination database for the COVID-19 pandemic in Canada*. *Sci Data* 2021;8:173. <https://doi.org/10.1038/s41597-021-00955-2>.
- [151] Bhatia D, Vaga K, Roerig M, Pawa J, Allin S, Marchildon G. *COVID-19 Case and Contact Management Strategies in Canada*. Toronto, ON: North American Observatory on Health Systems and Policies; 2020.
- [152] Barber B, Weeks L, Steeves-Dorey L, McVeigh W, Stevens S, Moody E, et al. *Hospital to Home: Supporting the Transition from Hospital to Home for Older Adults*. *Canadian Journal of Nursing Research* 2021;1. <https://doi.org/10.1177/084456212110044333>.

- [153] CIHI. New Long-Term Care Residents Who Potentially Could Have Been Cared for at Home (2019-2020). Your Health System n.d. <https://yourhealthsystem.cihi.ca/hsp/inbrief?lang=en#!/indicators/082/new-long-term-care-residents-who-potentially-could-have-been-cared-for-at-home/?mapC1;mapLevel2>; (accessed March 24, 2022).
- [154] Ontario Medical Association. Prescription for Ontario: Doctor's 5-point Plan for Better Health Care. 2021.
- [155] CIHI. Your Health System: In Depth All Data Export – Data Tables. Canadian Institute for Health Information 2022. <https://yourhealthsystem.cihi.ca/hsp/indepth?lang=en#/about>.
- [156] Fullman N, Yearwood J, Abay SM, Abbafati C, Abd-Allah F, Abdela J, et al. Measuring performance on the Healthcare Access and Quality Index for 195 countries and territories and selected subnational locations: a systematic analysis from the Global Burden of Disease Study 2016. *The Lancet* 2018;391:2236–71. [https://doi.org/10.1016/S0140-6736\(18\)30994-2](https://doi.org/10.1016/S0140-6736(18)30994-2).
- [157] Milligan C, Peckham A, Marchildon G. Healthcare Quality Councils: A Pan-Canadian Scan. Toronto: North American Observatory on Health Systems and Policies; 2018.
- [158] Canadian Medical Association, Canadian Nurses Association, Canadian Society for Long-Term Care Medicine, Canadian Support Workers Association. National Standards for Long-Term Care: The Art of the Possible? 2020.
- [159] SCC. Long-term care. Standards Council of Canada - Conseil Canadien Des Normes 2021. www.scc.ca/en/flagships/long-term-care (accessed May 17, 2022).
- [160] Health Standards Organization. About the Standard. HSO National Long-Term Care Services Standard n.d. <https://longtermcarestandards.ca/about-standard> (accessed May 17, 2022).
- [161] Roberts R, Bartram M, Kalenteridis K, Quesnel-Vallee A. Improving Access to Home and Community Care: An Analysis of the 2017 Health Accord. *Health Reform Observer* 2021;9. <https://doi.org/10.13162/hro-ors.v9i1.4367>.
- [162] Squires JE, Cho-Young D, Aloisio LD, Bell R, Bornstein S, Brien SE, et al. Inappropriate use of clinical practices in Canada: a systematic review. *CMAJ* 2022;194:E279–96. <https://doi.org/10.1503/cmaj.211416>.
- [163] CIHI. Unnecessary Care in Canada. Ottawa, ON: Canadian Institute for Health Information; 2017.
- [164] Vermeulen MJ, Stukel TA, Boozary AS, Guttman A, Schull MJ. The Effect of Pay for Performance in the Emergency Department on Patient Waiting Times and Quality of Care in Ontario, Canada: A Difference-in-Differences Analysis. *Annals of Emergency Medicine* 2016;67:496-505.e7. <https://doi.org/10.1016/j.annemergmed.2015.06.028>.
- [165] Rudoler D, Oliveira C de, Cheng J, Kurdyak P. Payment incentives for community-based psychiatric care in Ontario, Canada. *CMAJ* 2017;189:E1509–16. <https://doi.org/10.1503/cmaj.160816>.
- [166] Lavergne MR, Law MR, Peterson S, Garrison S, Hurley J, Cheng L, et al. A population-based analysis of incentive payments to primary care physicians for the care of patients with complex disease. *CMAJ* 2016;188:E375–83. <https://doi.org/10.1503/cmaj.150858>.
- [167] Staples JA, Liu G, Brubacher JR, Karimuddin A, Sutherland JM. Physician Financial Incentives to Reduce Unplanned Hospital Readmissions: an Interrupted Time Series Analysis. *J Gen Intern Med* 2021;36:3431–40. <https://doi.org/10.1007/s11606-021-06803-8>.

- [168] CIHI. Quebec – Has a Regular Health Care Provider. Your Health System 2022. <https://yourhealthsystem-cihi-ca.myaccess.library.utoronto.ca/hsp/indepth?lang=en#/indicator/074/2/C4000/N4lgQghgTg4IEAcAWBhALIANiAXKAHgCICmAZhAK6ZoDOuA2iCgBwAMAzAEwDsiANEzZdeAlhx79B4kVOGSxc0UILLp85TIUSAugF9dQAAA> (accessed August 17, 2022).
- [169] Breton M, Smithman MA, Kreindler SA, Jbilou J, Wong ST, Gard Marshall E, et al. Designing centralized waiting lists for attachment to a primary care provider: Considerations from a logic analysis. *Evaluation and Program Planning* 2021;89:101962. <https://doi.org/10.1016/j.evalprogplan.2021.101962>.
- [170] Hedden L, Barer ML, McGrail K, Law M, Bourgeault IL. In British Columbia, The Supply of Primary Care Physicians Grew, But Their Rate of Clinical Activity Declined. *Health Affairs* 2017;36:1904–11. <https://doi.org/10.1377/hlthaff.2017.0014>.
- [171] Lavergne MR, Peterson S, Mckendry R, Sivananthan S, McGrail K. Full-Service Family Practice in British Columbia: Policy Interventions and Trends in Practice, 1991–2010. *Health Policy* 2014;9:32–47.
- [172] Schultz SE, Glazier RH. Identification of physicians providing comprehensive primary care in Ontario: a retrospective analysis using linked administrative data. *CMAJ Open* 2017;5:E856–63. <https://doi.org/10.9778/cmajo.20170083>.
- [173] Marchildon G. Regionalization: What Have We Learned? *HealthcarePapers* 2016;16.
- [174] Marchildon G. The integration challenge in Canadian regionalization. *Cadernos De Saude Publica* 2019;35. <https://doi.org/10.1590/0102-311X00084418>.
- [175] Price D, Baker E, Golden B, Hannam R. Patient Care Groups: A new model of population based primary health care for Ontario. 2015.
- [176] Leslie M, Khayat-zadeh-Mahani A, Birdsell J, Forest PG, Henderson R, Gray RP, et al. An implementation history of primary health care transformation: Alberta's primary care networks and the people, time and culture of change. *BMC Fam Pract* 2020;21:258. <https://doi.org/10.1186/s12875-020-01330-7>.
- [177] Canadian Medical Association. Streamlining Patient Flow from Primary to Specialty Care: A Critical Requirement for Improved Access to Specialty Care 2020.
- [178] Young TK, Tabish T, Young SK, Healey G. Patient transportation in Canada's northern territories: patterns, costs and providers' perspectives. *Rural Remote Health* 2019;19:5113. <https://doi.org/10.22605/RRH5113>.
- [179] Truth and Reconciliation Commission of Canada. Truth and Reconciliation Commission of Canada: Calls to Action. Winnipeg, MB: 2015.
- [180] Turpel-Lafond (Aki-Kwe) ME. In Plain Sight: Addressing Indigenous-specific Racism and Discrimination in B.C. Health Care. British Columbia Ministry of Health; 2020.
- [181] British Columbia. A New Path Forward. British Columbia n.d. <https://declaration.gov.bc.ca/> (accessed May 13, 2022).
- [182] Government of Canada. Addressing anti-Indigenous racism in health systems: Federal response. 2021.
- [183] Health Canada. Shared Health Priorities: A new health accord supporting improved health care for Canadians 2017. www.canada.ca/en/health-canada/corporate/transparency/health-agreements/shared-health-priorities.html (accessed March 24, 2022).

- [184] CIHI. COVID-19's impact on hospital services 2021. www.cihi.ca/en/covid-19-resources/impact-of-covid-19-on-canadas-health-care-systems/hospital-services (accessed March 30, 2022).
- [185] Bruemmer R. It will take two years to reduce Quebec's surgery backlog, Dubé says. *Montreal Gazette* 2021.
- [186] Alberta Department of Health. Alberta health system sustainability and resiliency action plan. 2022.
- [187] Deloitte. Clearing the Backlog: The Cost to Return Wait Times to Pre-Pandemic Levels. 2020.
- [188] Wang J, Vahid S, Eberg M, Milroy S, Milkovich J, Wright F, et al. Clearing the surgical backlog caused by COVID-19 in Ontario: a time series modelling study. *CMAJ* 2020;192:E1347–56. <https://doi.org/10.1503/cmaj.201521>.
- [189] CIHI. Wait Times for Priority Procedures in Canada, 2021: Focus on the First 6 Months of the COVID-19 Pandemic. Ottawa, ON: 2021.
- [190] Association of Local Public Health Agencies. Public Health Resilience in Ontario: Clearing the Backlog, Resuming Routine Programs, and Maintaining an Effective COVID-19 Response. Association of Local Public Health Agencies; 2022.
- [191] Allan K, Piché-Renaud P-P, Bartoszko J, Bucci LM, Kwong J, Morris S, et al. Maintaining Immunizations for School-Age Children During COVID-19. 2021.
- [192] Brown DR, Hennecke P, Nottebrock D, Dhillon P. Vancouver Convention Health Centre (COVID-19 Response): Planning, implementation, and four lessons learned. *Am J Disaster Med* 2020;15:143–8. <https://doi.org/10.5055/ajdm.2020.0365>.
- [193] Herring J. Alberta to open temporary hospital beds as system strains under Omicron. *Calgary Herald* 2022.
- [194] Howlett K. Ontario, B.C., Quebec begin building makeshift hospitals in preparation for rise in COVID-19 patients. *The Globe and Mail* 2020.
- [195] CIHI. Virtual care: Impact of COVID-19 on patients receiving physician services. Canadian Institute for Health Information 2022. www.cihi.ca/en/virtual-care-impact-of-covid-19-on-patients-receiving-physician-services (accessed May 9, 2022).
- [196] Falk W. The State of Virtual Care in Canada as of Wave Three of the COVID-19 Pandemic: An Early Diagnostic and Policy Recommendations. Ottawa, ON: Health Canada; 2021.
- [197] Island Health. About Hospital at Home. Island Health n.d. www.islandhealth.ca/our-services/hospital-home-services/hospital-home (accessed February 28, 2022).
- [198] Ontario eServices Program. About the Ontario eServices Program. EServices n.d. <https://eservicesprogramontario.ca/ontario-eservices-program> (accessed February 2, 2022).
- [199] Statistics Canada. Health characteristics, annual estimates 2021. <https://doi.org/10.25318/1310009601-ENG>.
- [200] CIHI. Smoking gap by income has widened over time. Canadian Institute for Health Information 2015. www.cihi-ca.myaccess.library.utoronto.ca/en/smoking-gap-by-income-has-widened-over-time (accessed September 6, 2022).
- [201] Gupta S, Aitken N. COVID-19 mortality among racialized populations in Canada and its association with income. 2022.

- [202] Statistics Canada. Canadians' Health and COVID-19: Interactive Dashboard 2022. www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2021003-eng.htm (accessed March 2, 2022).
- [203] Etowa J, Hyman I, Dabone C, Mbagwu I, Ghose B, Sano Y, et al. Strengthening the Collection and Use of Disaggregated Data to Understand and Monitor the Risk and Burden of COVID-19 Among Racialized Populations. *Can Stud Popul* 2021;48:201–16. <https://doi.org/10.1007/s42650-021-00050-2>.
- [204] McKenzie K. Race and ethnicity data collection during COVID-19 in Canada: if you are not counted you cannot count on the pandemic response 2020. Ottawa: Royal Society of Canada.
- [205] McKenzie K. Socio-demographic data collection and equity in covid-19 in Toronto. *EClinicalMedicine* 2021;34. <https://doi.org/10.1016/j.eclinm.2021.100812>.
- [206] Subedi R, Greenberg L, Turcotte M. COVID-19 mortality rates in Canada's ethno-cultural neighbourhoods. Statistics Canada; 2020.
- [207] Hou F, Frank K, Schimmele C. Economic impact of COVID-19 among visible minority groups. Statistics Canada; 2020.
- [208] Raphael D. Poverty in Canada: Implications for Health and Quality of Life. 3rd ed. Toronto: Canadian Scholars; 2020.
- [209] Raphael D, Curry-Stevens A, Bryant T. Barriers to addressing the social determinants of health: Insights from the Canadian experience. *Health Policy* 2008;88:222–35. <https://doi.org/10.1016/j.healthpol.2008.03.015>.
- [210] Loppie C, Wien F. Understanding Indigenous health inequalities through a social determinants model. National Collaborating Centre for Indigenous Health; 2022.
- [211] Haworth-Brockman M, Betker C. Measuring What Counts in the Midst of the COVID-19 Pandemic Equity Indicators for Public Health. National Collaborating Centre for Infectious Diseases; 2020.
- [212] Statistics Canada. Life Tables, Canada, Provinces and Territories 1980/1982 to 2018/2020 (three-year estimates), and 1980 to 2020 (single-year estimates) 2022.
- [213] Statistics Canada. Infant deaths and mortality rates, by sex 2022. <https://doi.org/10.25318/1310071201-ENG>.
- [214] Statistics Canada. Number of maternal deaths and maternal mortality rates for selected causes 2022.
- [215] FAO. Suite of Food Security Indicators. FAOSTAT 2022. www.fao.org/faostat/en/#data/FS (accessed July 16, 2022).
- [216] CIHI. Hospitalization and Childbirth, 1995–1996 to 2020–2021 – Supplementary Statistics. Ottawa, ON: 2021.
- [217] Canadian Cancer Society. Canadian Cancer Statistics 2021. Toronto, ON: 2021.
- [218] PHAC. Canadian Chronic Disease Surveillance System. 2021.
- [219] Statistics Canada. Leading causes of death, total population, by age group 2022. <https://doi.org/10.25318/1310039401-ENG>.

- [220] Vamos S, Okan O, Sentell T, Rootman I. Making a Case for “Education for Health Literacy”: An International Perspective. *International Journal of Environmental Research and Public Health* 2020;17:1436. <https://doi.org/10.3390/ijerph17041436>.
- [221] Canadian Council on Learning. *Health literacy in Canada: A healthy Understanding*. Ottawa, ON: Canadian Council on Learning; 2008.
- [222] Deloitte. *An Economic Overview of Children’s Literacy in Canada*. Canadian Children’s Literacy Foundation; 2020.
- [223] Boot GR, Lowell A. Acknowledging and Promoting Indigenous Knowledges, Paradigms, and Practices Within Health Literacy-Related Policy and Practice Documents Across Australia, Canada, and New Zealand. *The International Indigenous Policy Journal* 2019;10. <https://doi.org/10.18584/iipj.2019.10.3.8133>.
- [224] Bryant T, Raphael D, Schrecker T, Labonte R. Canada: A land of missed opportunity for addressing the social determinants of health. *Health Policy* 2011;101:44–58. <https://doi.org/10.1016/j.healthpol.2010.08.022>.
- [225] Epp J. *Achieving Health for All: A Framework for Health Promotion*. Ottawa, ON: Ministry of National Health and Welfare; 1987.
- [226] Health Canada. *The Population Health Template: Key Elements and Actions That Define a Population Health Approach 2001*.
- [227] Lalonde M. *A New Perspective on the Health of Canadians*. Ottawa, ON: Government of Canada; 1974.
- [228] Manzano A, Raphael D. CPHA and the Social Determinants of Health: An Analysis of Policy Documents and Statements and Recommendations for Future Action. *Can J Public Health* 2010;101:399–404. <https://doi.org/10.1007/BF03404861>.
- [229] PHAC. *Background: Canada’s Response to WHO Commission on Social Determinants of Health*. Public Health Agency of Canada; 2006.
- [230] Raphael D, Bryant T. Maintaining Population Health in a Period of Welfare State Decline: Political Economy as the Missing Dimension in Health Promotion Theory and Practice. *Promotion & Education* 2006;13:236–42. <https://doi.org/10.1177/175797590601300402>.
- [231] Robertson A. Shifting Discourses on Health in Canada: From Health Promotion to Population Health. *Health Promotion International* 1998;13:155–66. <https://doi.org/10.1093/heapro/13.2.155>.
- [232] Almond D, Currie J, Duque V. Childhood Circumstances and Adult Outcomes: Act II. *Journal of Economic Literature* 2018;56:1360–446. <https://doi.org/10.1257/jel.20171164>.
- [233] Baker M, Messacar D, Stabile M. *The Effects of Child Tax Benefits on Poverty and Labor Supply: Evidence from the Canada Child Benefit and Universal Child Care Benefit 2021*. <https://doi.org/10.3386/w28556>.
- [234] PHAC. *Social determinants of health and health inequalities 2022*. www.canada.ca/en/public-health/services/health-promotion/population-health/what-determines-health.html (accessed December 7, 2021).
- [235] Tonelli M, Tang K-C, Forest P-G. Canada needs a “Health in All Policies” action plan now. *CMAJ* 2020;192:E61–7. <https://doi.org/10.1503/cmaj.190517>.

- [236] World Health Organization. Country Commitments. COP 26 Health Programme 2022. www.who.int/initiatives/cop26-health-programme/country-commitments (accessed May 12, 2022).
- [237] Environment and Climate Change Canada. Reporting greenhouse gas emissions: questions and answers 2018. www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting/reporting/questions-answers.html (accessed May 12, 2022).
- [238] Legislative Services Branch. Greenhouse Gas Pollution Pricing Act. 2018.
- [239] Ministry of Environment and Climate Change. Climate action legislation – Province of British Columbia. Climate Action and Accountability n.d. www2.gov.bc.ca/gov/content/environment/climate-change/planning-and-action/legislation (accessed May 12, 2022).
- [240] PHSA. Our Mandate. Provincial Health Services Authority n.d. www.phsa.ca/about/who-we-are/our-mandate (accessed May 12, 2022).
- [241] Eckelman MJ, Sherman JD, MacNeill AJ. Life cycle environmental emissions and health damages from the Canadian healthcare system: An economic-environmental-epidemiological analysis. *PLOS Medicine* 2018;15:e1002623. <https://doi.org/10.1371/journal.pmed.1002623>.
- [242] Pichler P-P, Jaccard IS, Weisz U, Weisz H. International comparison of health care carbon footprints. *Environ Res Lett* 2019;14:064004. <https://doi.org/10.1088/1748-9326/ab19e1>.
- [243] Canada. Canada's National Adaptation Strategy. Canada's Climate Plan 2021. www.canada.ca/en/services/environment/weather/climatechange/climate-plan/national-adaptation-strategy.html (accessed May 12, 2022).
- [244] CASCADES. About. Cascades Canada 2022. <https://cascadescanada.ca/about/> (accessed August 17, 2022).
- [245] CIHI. The Impact of COVID-19 on Long-Term Care in Canada: Focus on the First 6 Months. Ottawa, ON: 2021.
- [246] Brewster M. Why it took an outside-the-box use of the military to rip the lid off Canada's long-term care crisis. *CBC News* 2020.
- [247] Descurninges C. Coroner's inquest finds Laval long-term care residents dehydrated, starving and rarely cleaned. *CTV News* 2021.
- [248] Public Safety Canada. Reports On Long Term Care Facilities In Ontario & Quebec 2020. www.publicsafety.gc.ca/cnt/trnsprnc/brfng-mtrls/prlmntry-bndrs/20200831/069/index-en.aspx (accessed August 8, 2022).
- [249] Commissaire A La Sante Et Au Bien-Etre. Mandate on the Performance of Care and Services for Seniors - COVID-19: Consultation Report. Quebec: Commissaire A La Sante Et Au Bien-Etre; 2021.
- [250] Quebec Ombudsperson. The Quebec Ombudsman's Final Report: COVID-19 in CHSLDs during the first wave of the pandemic. Quebec: Protecteur Du Citoyen; 2021.
- [251] Stevenson V. Quebec coroner slams province for response to 1st wave deaths in long-term care. *CBC* 2022.
- [252] August M. Socialize, De-Commodify and De-Financialize Long-Term Care. *HealthcarePapers* 2021;20:34–9. <https://doi.org/10.12927/hcpap.2021.26642>.

- [253] Morton-Chang F, Williams P. Moving beyond More of the Same, but Better – How Campuses of Care Can Transform Long- Term Care. *HealthcarePapers* 2021;20:59–65. <https://doi.org/10.12927/hcpap.2021.26639>.
- [254] Siddiqi A, Laporte A. Rethinking Long-Term Care 2021;20.
- [255] Achou B, Glenzer F, Leroux M-L, Lee M, Donder PD. Canadians want home care, not long-term care facilities, after COVID-19. *The Conversation* 2021.
- [256] Drummond D, Sinclair D. Long-Term Care’s Financial Sustainability. *HealthcarePapers* 2021;20:15–9. <https://doi.org/10.12927/hcpap.2021.26645>.
- [257] Armstrong P. Our Values Are Showing: Long-Term Care and the Pandemic. *HealthcarePapers* 2021;20:10–4. <https://doi.org/10.12927/hcpap.2021.26646>.
- [258] Flood CM, Thomas B, White K. Excellent Long-Term Care for Canadians and Federal Legislation. *HealthcarePapers* 2021;20:27–33. <https://doi.org/10.12927/hcpap.2021.26643>.
- [259] Bueckert K. More beds coming as system tackles 5-year wait lists for long-term care. *CBC* 2021.
- [260] Kuluski K, Im J, McGeown M. “It’s a waiting game” a qualitative study of the experience of carers of patients who require an alternate level of care. *BMC Health Serv Res* 2017;17:318. <https://doi.org/10.1186/s12913-017-2272-6>.
- [261] CIHI. 1 in 9 new long-term care residents potentially could have been cared for at home. Canadian Institute for Health Information 2020. www.cihi-ca.myaccess.library.utoronto.ca/en/1-in-9-new-long-term-care-residents-potentially-could-have-been-cared-for-at-home (accessed July 27, 2022).
- [262] Lanoix M. No Longer Home Alone? Home Care and the Canada Health Act. *Health Care Anal* 2017;25:168–89. <https://doi.org/10.1007/s10728-016-0336-0>.
- [263] McGregor MJ, Ronald LA, Institute for Research on Public Policy. Residential long-term care for Canadian seniors: nonprofit, for-profit or does it matter? Montreal, Quebec: Institute for Research on Public Policy; 2011.
- [264] Hebert R. Quebec’s long-term care institutions need urgent comprehensive reform. *Policy Options* 2021.
- [265] Busby C. Long-term care reform in Canada will require a massive, multi-year effort. *Policy Options* 2021.
- [266] Fancott C, MacDonald T, Neudorf K, Keresteci M. Caregivers at the Heart of Re-Imagined Long-Term Care Delivery in Canada: Beyond the Pandemic. *HealthcarePapers* 2021;20:66–77. <https://doi.org/10.12927/hcpap.2021.26638>.
- [267] HSRC. Looking Back, Looking Forward – The Ontario Health Services Restructuring Commission. 2000.
- [268] Wong EKC, Thorne T, Estabrooks C, Straus SE. Recommendations from long-term care reports, commissions, and inquiries in Canada 2021. <https://doi.org/10.12688/f1000research.43282.3>.
- [269] Canada. Budget 2021: Part 1 - Finishing the Fight Against COVID-19 2021.

- [270] Ontario. Ontario Taking Action to Further Increase Staffing in Long-Term Care, Leading to More Direct Care for Residents. NewsOntarioCa 2022. <https://news.ontario.ca/en/release/1001774/ontario-taking-action-to-further-increase-staffing-in-long-term-care-leading-to-more-direct-care-for-residents> (accessed August 10, 2022).
- [271] Ontario. A better place to live, a better place to work: Ontario's long-term care staffing plan. OntarioCa 2020. www.ontario.ca/page/better-place-live-better-place-work-ontarios-long-term-care-staffing-plan (accessed August 10, 2022).
- [272] Ayers T. Long-term care funding in N.S. will improve infection control, says industry. CBC 2022.
- [273] Lofaro J. Federal government signs \$221-million agreement with Quebec for long-term care homes. CTV News 2022.
- [274] McConnell L. Ontario to pour \$673 million into long term care homes in 2022, Whitby MPP announces. Insauga 2022.
- [275] Tran P. Alberta government to expand continuing care facilities, services with \$3.2B investment | Globalnews.ca. Global News 2022.
- [276] Waterloo Region. Province announces funding for more long-term-care beds in Waterloo Region. TherecordCom 2022. www.therecord.com/news/waterloo-region/2022/04/08/province-announces-funding-for-more-long-term-care-beds-in-waterloo-region.html (accessed August 10, 2022).
- [277] Roman K. New long-term care standards will fall flat without money or enforcement, experts warn. CBC News 2021.
- [278] Silver J. Budget promises more than \$3B for seniors and long-term-care improvements. IPolitics 2021.
- [279] PHAC. Canadian COVID-19 vaccination coverage report. Ottawa, ON: 2022.
- [280] CBC News. 4th dose hopefuls will have to wait for booster shot, says Dr. Bonnie Henry, despite expiring stock. CBC 2022.
- [281] Djuric M, Osman L. Canada has thrown away at least one million COVID-19 vaccine doses: informal survey. CTV News 2021. www.ctvnews.ca/health/coronavirus/canada-has-thrown-away-at-least-one-million-covid-19-vaccine-doses-informal-survey-1.5672817 (accessed August 22, 2022).
- [282] CIHI. COVID-19 Intervention Timeline in Canada. Canadian Institute for Health Information 2022. www.cihi.ca/en/covid-19-intervention-timeline-in-canada (accessed August 22, 2022).
- [283] PHAC. COVID-19: How provinces and territories make decisions about how, who and when to vaccinate 2021. www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19/vaccines/provinces-territories-decisions-how-who-when-vaccinate.html (accessed August 22, 2022).
- [284] Dubé E, Gagnon D, MacDonald N. Between persuasion and compulsion: The case of COVID-19 vaccination in Canada. *Vaccine* 2022;40:3923–6. <https://doi.org/10.1016/j.vaccine.2022.05.053>.
- [285] Lavoie K, Gosselin-Boucher V, Stojanovic J, Gupta S, Gagné M, Joyal-Desmarais K, et al. Understanding national trends in COVID-19 vaccine hesitancy in Canada: results from five sequential cross-sectional representative surveys spanning April 2020–March 2021. *BMJ Open* 2022;12:e059411. <https://doi.org/10.1136/bmjopen-2021-059411>.

- [286] Lin S. COVID-19 Pandemic and Im/migrants' Elevated Health Concerns in Canada: Vaccine Hesitancy, Anticipated Stigma, and Risk Perception of Accessing Care. *J Immigrant Minority Health* 2022;24:896–908. <https://doi.org/10.1007/s10903-022-01337-5>.
- [287] PHAC. COVID-19 vaccination coverage by ethnicity: Insight from the Canadian Community Health Survey (CCHS) 2022. www.canada.ca/en/public-health/services/immunization-vaccines/vaccination-coverage/covid-19-vaccination-coverage-ethnicity-insight-canadian-community-health-survey.html (accessed August 22, 2022).
- [288] Brown B. "We're on top of it," health minister says to critic of Nunavut vaccine rollout. CBC 2021.
- [289] McKay J. Iqaluit MLA calls vaccine rollout a "communications fiasco." CBC 2021.
- [290] NCCDH. "We were out ahead of public health": Leading COVID-19 vaccine equity for Black communities across Canada. Antigonish, NS: National Collaborating Centre for Determinants of Health; 2021.
- [291] Jonas S. Toronto communities hardest-hit by pandemic sound alarm about inequitable distribution of vaccines. CBC News 2021.
- [292] The Canadian Press. Black Canadians more likely to be hesitant about COVID-19 vaccines, survey suggests. CBC 2021.
- [293] Snape MD, Viner RM. COVID-19 in children and young people. *Science* 2020;370:286–8. <https://doi.org/10.1126/science.abd6165>.
- [294] Smylie J, McConkey S, Rachlis B, Avery L, Mecredy G, Brar R, et al. Uncovering SARS-COV-2 vaccine uptake and COVID-19 impacts among First Nations, Inuit and Métis Peoples living in Toronto and London, Ontario. *CMAJ* 2022;194:E1018–26. <https://doi.org/10.1503/cmaj.212147>.
- [295] Tasker JPT· C. Vaccine envy: Why can't Canada make COVID-19 doses at home? | CBC News. CBC 2021. www.cbc.ca/news/politics/domestic-vaccine-manufacturing-canada-1.6004427 (accessed August 22, 2022).