CADTH

CADTH Health Technology Review

Specialized Clinics and Health Care Professional Resources for Post–COVID-19 Condition in Canada

Environmental Scan

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Key Messages

- This Environmental Scan aims to provide an overview of the current range and scope of both specialty clinics and available resources for health care professionals about post–COVID-19 condition in Canada. This scan was informed through a limited literature search and a survey completed by targeted contacts across Canada.

- Based on the survey responses, specialized clinics for post–COVID-19 condition have been established or are in development in Alberta, British Columbia, New Brunswick, Ontario, and Quebec. These clinics exist in various forms and range in their structural characteristics, operational characteristics, and stage of program development and quality improvement activities.

- At the time the survey was administered, there were no specialized clinics located in Manitoba, Newfoundland and Labrador, Northwest Territories, Prince Edward Island, Saskatchewan, and Yukon. These jurisdictions are at various stages in their approach to addressing post–COVID-19 condition, ranging from prevention efforts to the discussion of and planning for the implementation of clinics in their own jurisdiction.

- Based on the results of the literature search, there are a variety of resources that have been developed to improve the education, awareness, and training of health care professionals about post–COVID-19 condition. Referral pathways, tools for symptom screening and patient management, and educational resources, such as webinars, are among the most common. Resources about the development of clinics or models of care for post–COVID-19 condition have also been created.

- There is a gap in the jurisdictional representation from some provinces and territories for specialty clinics for post–COVID-19 condition. In addition, this Environmental Scan is not exhaustive and does not necessarily capture all existing clinics in each jurisdiction nor does it provide a comprehensive list of all available resources for health care professionals.

Context

COVID-19 is an infectious disease caused by SARS-CoV-2. As of December 12, 2022, there have been more than 645 million confirmed cases globally since the emergence of the disease in late 2019.[1] COVID-19 was originally characterized as an acute disease that can take approximately 2 to 6 weeks to recover, depending on the severity of illness.[2] However, as the pandemic evolved, so has knowledge about the long-term effects of COVID-19 and it has become clear that symptoms can last beyond this 6 week period.

Post–COVID-19 condition, often referred to as long COVID (among many other terms being used), is a growing health concern across Canada. It is a relatively new condition recognized by the Public Health Agency of Canada (PHAC) and WHO.[3,4] The condition is defined as new or persistent physical or psychological symptoms present at 3 months after the initial COVID-19 infection that last for at least 2 months and cannot be explained by another cause.[5] Symptoms of post–COVID-19 condition can vary substantially but often include fatigue, body aches, respiratory difficulties such as shortness of breath, and cognitive and mental health challenges.[6] Symptoms may occur in people who experienced either mild or severe acute COVID-19. In 2022, Statistics Canada estimated that 32.0% of people living in Canada aged 18 years or older had reported previous lab-confirmed COVID-19 infection and another 8.3% suspected previous infection.[7] Canadian estimates of prevalence suggest 14.8% of adults

with confirmed or suspected infection may have developed post–COVID-19 condition, but there may be variation based on demographic factors and severity of initial infection.[8]

Due to limited diagnostic criteria and lack of knowledge about pathophysiology, there are few treatment and management options as standard of care for post–COVID-19 condition. Rather, a variety of therapies for people with post–COVID-19 condition are being investigated.[9] Understanding effective and sustainable approaches for delivering interventions is an important area of care. Jurisdictions across Canada and internationally have initiated different models of care for post–COVID-19 condition. A living systematic review identified at least 7 ongoing models of care in Canada, with varied approaches for referrals, screening and assessment, health care professionals involved in delivering care, integration of care, and other operational aspects.[10] These models use a combination of specialty clinics, integrated primary care, and specialists' care to provide support to patients.

However, as the prevalence of post–COVID-19 condition grows, there is a need for detailed information about the range and scope of specialty clinics operating across Canada. Information about clients served, operational features, and funding arrangements can help health care decision-makers understand the sustainability and effectiveness of different specialty clinics. Moreover, jurisdictions across Canada have developed numerous resources to provide education, awareness, and training to health care professionals about post–COVID-19 condition. A cohesive, pan-Canadian inventory of these resources and information can help facilitate learning and reduce duplication of effort for those jurisdictions in the early stages of planning ways to address care for post–COVID-19 condition.

This Environmental Scan is part of a wider program of focus for CADTH to produce a collection of work on post–COVID-19 condition that relates to the prevention, diagnosis, classification, and treatment of the condition. The purpose of this report is to provide a current overview of the range and scope of both specialty clinics and available resources for health care professionals regarding post–COVID-19 condition. Although Canadian jurisdictions are at different stages of assessing long-term investments for post–COVID-19 condition, an overview about different approaches implemented across the country and resources that are used or being developed could support jurisdictions in exploring, planning, and assessing their needs.

Objectives

The key objectives of this Environmental Scan are as follows:

1. Describe the landscape of specialized post–COVID-19 condition clinics operating across Canada. This includes identifying and describing post–COVID-19 condition clinics operating or in development in Canada, their structural and operational characteristics, as well as any program development and quality improvement activities.

2. Describe the resources that have been developed by Canadian jurisdictions to improve education, awareness, and training of health professionals about post–COVID-19 condition.

Research Questions

1. What is the landscape of specialized post–COVID-19 condition clinics operating across Canada?

    a) What specialized clinics are operating in Canada?

    b) How many are operating in different jurisdictions?

    c) Where are they located?

    d) What are their operational features, including staff, referral criteria, virtual components, and funding models?

2. What resources have been developed or are currently being used by jurisdictions to improve education, awareness, and training of health care professionals about post–COVID-19 condition?

3. What resources have been developed to guide the treatment and management of people with the condition (e.g., symptom assessment tools, clinical guidance)?

Methods

To complete this Environmental Scan, we conducted a limited search and review of grey and published literature and an online survey that are described subsequently. Table 1 outlines the criteria for information gathering and literature selection.

Literature Search

A literature search was performed to address research questions 2 and 3. It was also used to supplement the survey data for research question 1.

Grey literature was identified by searching sources listed in relevant sections of the CADTH COVID-19 Grey Literature Resources web page, including the COVID-19 websites of Canadian jurisdictions. Google was used to search for additional internet-based materials. Retrieval was not limited by language or date. Date limits were not imposed due to the recentness of COVID-19 as a concept. We searched grey literature due to the relatively new nature of post–COVID-19 condition. Clinics may still be in the development process, and few are actively operating; therefore, the amount of published literature on this topic was expected to be limited. Similarly, the resources developed for health care professionals related to post–COVID-19 condition were anticipated to have been developed recently and could be available in formats that are not necessarily available in published literature (e.g., checklists, referral pathways).

A limited database literature search was also conducted in MEDLINE on October 11, 2022, to capture published articles on Canadian post–COVID-19 condition clinics. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were post–COVID-19 condition clinics and Canada. The search was not limited by language, date, or study type. The search strategy is available upon request.

Screening and Study Selection

One researcher screened the grey literature for relevance primarily to address research objective 2 (research questions 2 and 3). For this objective, relevant information included resources developed to improve education, awareness, and training of health care professionals about post–COVID-19 condition. Relevant information also included guidance on the treatment and management of people with the condition. Following review of the survey results, the researcher then screened the grey literature for relevance to objective 1 (research question 1) for information about the post–COVID-19 condition clinics that exist or are in development.

Survey

We conducted a survey to identify specialized post–COVID-19 condition clinics operating and/or being planned across Canada. This was the primary method used to address research question 1 only. We conducted a survey due to the paucity of research and information available, given that these clinics are relatively new. Compared with synchronous data collection approaches, a survey allowed for the engagement of multiple respondents simultaneously in a timely and efficient manner, while also respecting and accommodating the busy schedules of these individuals.

The survey explored multiple components of these clinics, including the number of clinics operating in different jurisdictions, their locations, and various operational features (e.g., staff, referral criteria, virtual components, and funding models). The survey comprised 41 questions, and the questions were repeated depending on how many clinics the participant was aware of. The survey consisted of both open- and close-ended questions. The questions were designed to capture the information listed in Table 1. All survey questions are presented in Appendix 1.

Project team members reviewed and piloted the survey, which was distributed using SurveyMonkey. The survey opened on November 1, 2022, and responses were collected until November 16. Upon request, the survey remained open until November 29 to allow additional participants to complete the survey.

The survey was distributed electronically to established jurisdictional contacts, which included clinic managers from provincial, territorial, and local health authorities, and other health professionals with or without academic affiliations, all with knowledge and experience to help identify post–COVID-19 condition clinic models, settings, staffing, populations served, evaluation, tools, and treatments currently being considered. We identified these contacts through CADTH's engagement and ongoing relationship development with jurisdictional representatives to understand evidence needs related to post–COVID-19 condition. We made an effort to have representation from all Canadian jurisdictions by reaching out to contacts from every province and territory. We used a snowball sampling approach to ensure that the survey included individuals knowledgeable around post–COVID-19 condition clinics. To do so, the survey invitation indicated that contacts had the option to share the survey within their networks.

One email reminder was sent out to nonresponders 1 week after the initial invitation. A follow-up email was sent to responders to capture additional information about waitlists and wait times, which was not explicitly asked about in the survey. All respondents provided explicit permission to use the information that they provided in this report. Information about eligible survey respondents is outlined in Appendix 2, Table 5. We provided survey respondents

an opportunity to review and provide feedback on a draft of this Environmental Scan and subsequently incorporated their comments and suggestions into the report.

Table 1: Components for Literature Screening and Information Gathering

Criteria	Description
Population	People of all ages with post–COVID-19 condition[a]
Intervention	Specialized post–COVID-19 clinics operating across Canada
Settings	Primary, tertiary, community, or long-term care facilities in rural, remote, and urban areas
Types of information	Models and clinic characteristics: • guiding principles • number of clinics in a jurisdiction • integrated referral, integrated care pathway • virtual health components • date of set-up and duration clinic has been operational • expected date of implementation (e.g., pilot program not yet implemented) • extent of interdisciplinary approach (if applicable) • funding mechanisms
	Setting and location: • city, province, other information relevant to setting (e.g., urban or rural, academic setting)
	Affiliation: • association with a hospital (e.g., outpatient, rehabilitation, primary care unit, COVID-19 unit) • association with primary care practices and role of primary care • association with academic institution
	Staffing: • type and number of health care professionals involved (e.g., full-time equivalents) • type and number of nonclinical staff involved (e.g., social workers, counsellors, physiotherapy)
	Population served • age (e.g., adults only, adults and children) • referral criteria and approach • exclusion criteria • number of patients served • demand for services
	Research or evaluation: • whether data (and type of data) are collected and reported • any research or analysis to assess patient outcome • program development • quality improvement initiatives
	Tools: • types of screening and assessment tools • types of diagnostic tools

Criteria	Description
	Treatments: • treatments provided (e.g., rehabilitation, pain management, respiratory)

ªCADTH has adopted the WHO definition for post−COVID-19 condition which is any symptoms experienced 12 weeks or more after initial infection, diagnosis, or symptom onset that cannot be explained by another cause. This report will consider information that may use other post−COVID-19 definitions (e.g., symptoms after > 4 weeks).

Synthesis Approach

To address objective 1 (i.e., research question 1), 1 researcher analyzed the survey findings and narratively summarized clinic characteristics into relevant categories. To do so, the researcher systematically identified and sorted survey findings into 3 categories: structural characteristics, operational characteristics, and program development and quality improvement activities. The responses from jurisdictions that indicated that they do not have specialized clinics for post−COVID-19 condition were analyzed and reported separately from the responses of jurisdictions with clinics. All responses were included when there were multiple eligible responses for the same clinic(s). We used findings from the grey literature relevant to research question 1 to help supplement the survey results and incorporated into the narrative review. Findings were reported by jurisdiction.

To address objective 2 (research questions 2 and 3), 1 researcher analyzed the findings from the relevant grey literature. The findings included the available resources aimed at improving education, awareness, and training of health care professionals about post−COVID-19 condition and guiding the treatment and management of people with the condition. The results are reported in a brief narrative overview and summary of findings table (Table 2).

We did not identify any relevant studies from the database literature search that addressed either objective 1 or objective 2.

Findings

The findings presented for this Environmental Scan are based on a survey and a limited search of the grey literature. Findings are presented by the objectives of this report.

For objective 1, we received responses for clinics in 11 of 13 Canadian jurisdictions Thirty-one individuals were invited to participate in the survey. The survey yielded 25 complete responses. We deemed survey respondents eligible for inclusion in the findings if they provided information relevant to the scope of the Environmental Scan. Excluded survey respondents were those who did not provide any details beyond demographic data and an awareness of the existence of clinics and affiliations. The 25 complete responses were from Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Northwest Territories, Ontario, Prince Edward Island, Quebec, Saskatchewan, and Yukon. Respondents reported being medical and operations directors, health care providers, and program managers and coordinators.

Respondents indicated that there were specialized post−COVID-19 condition clinics currently operating or being developed in 5 provinces (Alberta, British Columbia, New Brunswick, Ontario, and Quebec). Of note, in the case of British Columbia, we refer to a "network of clinics." Although we received only 1 survey response from British Columbia, it implied that

there are multiple individual clinics that span multiple cities but they fall under 1 larger umbrella in the form of a province-wide network. This is similar to New Brunswick; however, its network is still in development. In Alberta, clinics may operate in a way to coordinate between multiple sites; however, the response from British Columbia specifically referred to existing clinics in the province as a network. When discussing the results of the survey as a whole, we use the term "clinic" in this report. This encapsulates both individual clinics and networks of clinics. Participants provided responses for 20 distinct clinics, and we were notified about 5 additional clinics and their information (publicly available online) through a survey respondent, for a total of 25 specialized clinics for post−COVID-19 condition.[11] Table 6 in Appendix 3 presents a summary of findings for the characteristics of these clinics.

For objective 2, the grey literature search yielded 8 resources that provided information on the types of resources available to health care providers about post−COVID-19 condition, such as education and training materials, and 11 resources related to the guidance on the development of clinics and models of care for post−COVID-19 condition.

Objective 1: Landscape of Specialized Post−COVID-19 Condition Clinics Operating Across Canada

Jurisdictions With Clinics

Five Canadian jurisdictions were reported to have specialized clinics for post−COVID-19 condition. These jurisdictions are Alberta, British Columbia, New Brunswick, Ontario, and Quebec. Survey respondents identified 25 clinics: 3 clinics in Alberta, 1 network of clinics in British Columbia, 2 clinics (1 individual and 1 network) in New Brunswick, 11 clinics in Ontario, and 8 clinics in Quebec. However, this survey is not exhaustive, and responses may not necessarily capture all existing clinics in each jurisdiction. Rather, the numbers provided are reflective of the responses received.

In the descriptions of the clinics indicated in the survey responses, 7 clinics were characterized as units and 9 were characterized as coordinated efforts. Although survey responses were not obtained for the additional 5 clinics that we were notified about, based on the available information, 4 are likely to be units and 1 is likely to be a unit and/or coordinated effort. A unit was defined as a dedicated ward or centre that provides services at 1 location specifically for post−COVID-19 condition. A coordinated effort was defined as care not limited to specific centres or spaces but providing integrated care and support to people across different specialists. Clinics characterized as units and coordinated efforts often included multidisciplinary and interdisciplinary teams that provided general care, rehabilitation, and follow-up support for individuals with post−COVID-19 condition. Three clinics were characterized as programs and 2 as general chronic care support. These clinics share many characteristics and services with the clinics identified as units and coordinated efforts. A program was defined as a set of services providing dedicated care for post−COVID-19 condition across multiple centres or locations. General chronic care support was defined as care provided for different health conditions, including post−COVID-19 condition, but not dedicated only to post−COVID-19 condition. Clinics could be classified as more than 1 type. Additionally, 2 respondents characterized clinics in their jurisdiction as provincial care networks or frameworks that facilitated the coordination of care across their respective jurisdictions. One clinic located in Ontario is dedicated to a specific manifestation of post−COVID-19 condition (cognitive sequelae), and another Ontario clinic is focused on pulmonary rehabilitation. Overall, there were no notable differences in the structural characteristics, operational characteristics, and/or program development and quality improvement activities

between the types of clinics (i.e., units, coordinated efforts, programs, and general chronic care support).

Structural Characteristics

The structural characteristics of specialized clinics that we aimed to understand included location, how long they have been operational, funding, affiliations, staffing, and population served.

Specialized clinics for post–COVID-19 condition tend to serve large areas, regardless of where they are physically located, from regions to overall jurisdictions. In terms of physical location, all identified clinics are in urban centres, although they may serve populations across their regions, such as clinics in Alberta where an Edmonton-based clinic serves the northern half of the province and a Calgary-based clinic serves the southern half. Clinics characterized as provincial frameworks or networks, like those in British Columbia and New Brunswick, provide services throughout their respective jurisdictions.

Respondents reported that clinics have been operating for varied durations, ranging from early development stages (2 clinics in Quebec and 1 network in New Brunswick) up to 2.5 years (1 clinic in Alberta, 1 network of clinics in British Columbia, and 1 clinic in Quebec). At least 12 clinics have been operating for 1 year or longer. The clinics that are still under development are projected to begin operation between late 2022 and early 2023.

Twelve clinics have both hospital and academic affiliations, 4 clinics have only hospital affiliations, and 2 clinics have only academic affiliations Three clinics have hospital, academic, and primary care practice affiliations, 1 clinic has both a hospital and primary care practice affiliation, and 1 clinic has only a primary care practice affiliation. Those with hospital affiliations are outpatient or rehabilitation clinics. The hospitals are typically academic in nature and associated with universities. Additionally, respondents noted that patients and data from the clinics are often involved in research about post–COVID-19 condition. Affiliations with primary care practices take the form of referral pathways, shared care, and educational collaboration.

To be referred to a specialized post–COVID-19 condition clinic, 13 clinics require patients to have probable or confirmed COVID-19 and persistent symptoms for at least 4 to 12 weeks (dependent on the clinic) that cannot be explained by another illness. Two clinics in Ontario require that patients need at least 2 health disciplines for treatment. One of these clinics also requires that patients be willing to participate in group interventions. Ten clinics require referral from a physician. Seventeen specialized clinics serve people aged 18 and older. One clinic in Ontario serves patients ranging in age from 16 to 90 years and 2, located in New Brunswick, serve or plan to serve people of any age. In many cases, information about the number of patients served was not known to respondents. For the 6 clinics for which this information was available, there is a large range in the number of clients being served, from 4 people to approximately 100 people per month. Clinics characterized as provincial networks serve a total of approximately 400 individuals per month. Data on wait times was available for 10 clinics. Responses were from Alberta, British Columbia, Ontario, and Quebec. Respondents noted anywhere from 1 to approximately 340 patients on waitlists, who may be waiting between 2 weeks and 12 months to be seen by nursing staff or physicians.

Typically, the clinics consist of clinical staff, including physicians (both primary care physicians and specialist physicians), nurse practitioners, and registered nurses. Clinics also consist of allied health professionals, including social workers, psychologists, occupational

therapists, physiotherapists, respiratory therapists, speech-language pathologists, dieticians, and physiatrists. One clinic in Ontario has a community health navigator on staff. Clinics typically have administrative professionals on staff as well. The specialties of the specialist physicians span many disciplines.

The clinics are typically funded by their respective provinces and ministries of health, including some special projects dedicated to post–COVID-19 condition. Some of the clinics that operate out of hospitals do not receive dedicated funding, but rather access the same funding received by their associated hospital or hospital program. Two clinics in Ontario operate with in-kind resources from programs at the hospitals with which they are associated.

Operational Characteristics

The operational characteristics of the clinics that we sought to explore included information about guiding principles, care components, treatment approaches, and tools for screening and diagnosis.

The guiding principles used to inform clinic operations most often include patient- and family-centred care, self-management and patient education, integrated care, and evidence-based care. Two respondents noted that evidence-based care can be difficult given that post–COVID-19 condition is relatively new, and a third respondent noted that practices are often re-evaluated to align with the most up-to-date guidance. To a lesser extent, clinics also use case management, coordination of care, and tiered approaches to care. Fifteen of the identified offer an interdisciplinary or multidisciplinary care approach, consisting of collaborative efforts between various clinical staff and allied health professionals. These partnerships enable patients to receive treatments appropriate to their symptoms, referrals to additional services, and access to community-based rehabilitation programs, as necessary. A common focus of this approach is ensuring that patients are provided with education and an understanding of self-management for their individual symptoms.

There are multiple types of care components present at the various specialty clinics for post–COVID-19 condition. Those present most often include virtual health care, patient needs assessments, referral systems, and follow-up systems. Some clinics also have integrated referral or integrated care pathway components and assessments of social determinants of health. One clinic offers peer support. Currently, none of the clinics offer in-person home-based care. Virtual health components are present at 17 clinics and may take the form of telehealth, videoconferencing, e-consults, and information sessions. The virtual care may be group-based or individualized and can cover general post–COVID-19 condition care or be tailored to a patient's specific needs. Virtual care may be provided when patients live remotely and cannot access the clinic in person or in cases in which individuals prefer it to in-person care. A summary table of the care components present at clinics in each jurisdiction can be found in Appendix 3, Table 6.

Multidisciplinary teams of health care professionals usually complete a patient needs assessment to determine the most fitting care for each patient. Standardized, validated tools and checklists are often used to assist in this process. Respondents reported 25 different assessment tools, some of the most common of which include the Post-COVID-19 Functional Status scale, the EQ-5D-5L, and the COVID-19 Yorkshire Rehabilitation Scale. Referral systems are present in 15 clinics and are typically comprise primary care and/or specialist physicians and nurse practitioners. Some of the systems are centralized. Integrated referral or integrated care pathways, which are present in 5 clinics, may be characterized by the use of health information sharing systems such as Connect Care, which is a provincial electronic medical

record used in Alberta. Follow-up care is present at 10 clinics and may be determined on a case-by-case basis or provided as a general service to all patients. Follow-ups may be provided at prespecified time intervals or may be scheduled based on patient needs. Once health care professionals determine the trajectory of the patient's care, the patient is linked to other physicians and allied health professionals as needed.

A wide variety of screening and symptom assessment tools are used in these clinics. These tend to be validated tools to measure items such as function, fatigue, symptoms, mental health, and quality of life, including those previously mentioned. A detailed list of the tools can be found in Appendix 3, Table 8. Similarly, a large range of diagnostic tools are used at these clinics. These generally include blood tests, lab work, imaging, and paraclinical tests. A detailed list of diagnostic tools and tests can also be found in Appendix 3, Table 8. For clinics that provide an assessment of social determinants of health, this is included as either part of the clinic intake assessment conducted by a nurse practitioner or assessed using the COVID-19 Yorkshire Rehabilitation Scale tool, which includes questions about vocation and employment status. These clinics are characterized as units and are located in Alberta and Ontario.

The treatments provided at the post–COVID-19 condition specialty clinics are typically medical, psychological, and social in nature. This includes symptom management, rehabilitative care, counselling, and education. Rehabilitative care is offered both in group and individual settings. Treatments are typically tailored to specific manifestations of post–COVID-19 condition, such as mood, pain, fatigue, or cognitive symptoms. The clinics may also act as first points of contacts where patients are assessed and then receive further referrals to specialized care based on their symptoms.

Overall, these operational characteristics did not vary by the type of clinic (e.g., a unit, a coordinated effort). The 1 notable exception to this was that those clinics that used interdisciplinary or multidisciplinary approaches to care as guiding principles were most often characterized as units.

Program Development and Quality Improvement Activities

The program development and quality improvement activities that we inquired about included data collection and reporting, research and analysis on patient outcomes, assessments on intervention outcomes, and economic impact evaluations.

Data collection and reporting is completed at 8 of the specialty clinics for post–COVID-19 condition. The types of data collected and reported include patient characteristics (e.g., age, height, sex), clinic utilization and performance indicators, wait list information, results of screening and diagnostic assessments, and feedback from patients and professionals about their symptoms and the impact of services received. These data are collected and reported through methods such as REDCap or other provincial clinical databases and may be reported in research papers. Some of the clinics are in the process of developing their methods for developing and reporting data and were unable to provide details at the time the survey was administered. As discussed previously, social determinants of health are assessed at 2 clinics. However, the tools used to perform these assessments, such as the COVID-19 Yorkshire Rehabilitation Scale, may be limited in their ability to capture dimensions of interest relevant to equity-deserving groups (e.g., Indigenous status, physical environment, housing status, social exclusion). This, in turn, limits the information about whether these equity-deserving groups can access and/or are served by these clinics.

The 7 clinics that assess patient outcomes conduct patient satisfaction surveys, quality improvement work, program evaluations related to symptoms and recovery, and epidemiological studies on prevalence and health-related quality of life over time as well as studies on immune response in individuals with post–COVID-19 condition. One clinic in Quebec is in the process of developing these methods for research and analysis for assessing patient outcomes. Further, in British Columbia and 1 clinic in Quebec, research is being used for secondary purposes or being conducted in secondary centres using clinic data. Eight clinics conduct evaluations to assess the outcomes of their interventions. Evaluations are conducted on patient-centred and standardized self-reported outcomes. Two respondents noted that some of the tools and characteristics they use to assess patient outcomes are also used to assess the outcomes of their interventions, including program evaluations related to symptoms and recovery. Additional interventions assessed include education and rehabilitation. Respondents reported that that assessments for intervention outcomes are in development at 3 clinics in Quebec.

Three clinics conduct economic impact evaluations, and 2 are in the process of developing economic evaluation methods. For the few clinics that do conduct economic evaluations, data such as health system utilization, use of emergency departments, patient outcomes, and data linkages are used to analyze economic impact. One respondent from Ontario noted that economic evaluations are not feasible due to the complexity associated with a new condition such as post–COVID-19 condition and its effects on rehabilitation services.

Jurisdictions Without Clinics

Respondents from 6 Canadian jurisdictions reported that, at the time of the survey, there were no specialized post–COVID-19 clinics operating in their jurisdictions. These jurisdictions were Manitoba, Newfoundland and Labrador, Northwest Territories, Prince Edward Island, Saskatchewan, and Yukon. Respondents from 2 of these jurisdictions, Northwest Territories and Yukon, stated that patients may be referred to clinics in other nearby jurisdictions in Alberta and/or British Columbia in the future. Two jurisdictions, Manitoba and Saskatchewan, are reportedly in early discussion and/or planning stages for treatment of post–COVID-19 condition, including plans to integrate care of patients with post–COVID-19 condition into existing health care networks. One jurisdiction, Newfoundland and Labrador, is considering alternative approaches for post–COVID-19 condition that may not require specialty clinics. These may include allocating more resources to provide treatments for acute COVID-19, prevent post–COVID-19 condition, and provide more self-management and education techniques. In Prince Edward Island, the respondent noted there is limited feasibility of creating clinics in their jurisdiction due to lack of resources. Rather, their focus is on providing information and education resources for self-care and limiting the incidence of post–COVID-19 condition with treatments like Paxlovid and/or high vaccine coverage.

Objective 2: Resources Developed by Canadian Jurisdictions to Improve Education, Awareness, and Training of Health Professionals About Post–COVID-19 Condition

Resources for Education, Awareness, and Training

We identified 7 Canadian jurisdictions that had publicly available resource web pages that provided education, awareness, and training materials for health care professionals about post–COVID-19 condition as well as 1 pan-Canadian resource. The main types of resources available include information about referrals, screening and assessment tools, and strategies

for patient management. Additionally, most resource web pages provided links to additional literature and educational materials on general post–COVID-19 condition that were developed both within Canada and internationally. Note the goal of the search for resources was not to be exhaustive or comprehensive, but rather to present examples of the types of content produced by various jurisdictions. Table 2 provides a summary of the types of resources available as well as links to the main resource pages for further information.

Table 2: Summary of Education, Awareness, and Training Resources for Health Care Providers

Jurisdiction	Resource web page	Types of resources available for health care providers
Alberta	Recovery & Rehabilitation After COVID-19: Resources for Health Professionals[12]	• Referrals • Patient assessment tools and guidance • Screening and pathways • Educational resources and support lines
British Columbia	Post–COVID Recovery Care[13]	• Referrals • Specialist consultation services • Learning modules • Care pathways • Research and literature • Additional educational resources
Manitoba	Helping Patients Get Back to Life after COVID-19[14]	• Referral pathways • Screening tool • Educational material • Literature and guidelines
Nova Scotia	Post-COVID in Primary Health Care Practice Supports[15]	• Clinical practice guidelines • Published and grey literature • Rapid reviews • Practice tools and resources for patients • Learning modules and webinars • Additional supports

Ontario	Post–COVID-19 Condition: Guidance for Primary Care[16]	• Guidance on:
		  ○ assessment
		  ○ management
		  ○ follow-up and monitoring
		• Assessment tools
		• Referrals
		• Additional educational resources

Quebec	Clinical Management Tools – Post-COVID-19 Conditions[17]	• Clinical management tools, organized by manifestation:
		  ○ rehabilitation
		  ○ cardiorespiratory
		  ○ postexertional malaises and fatigue
		  ○ neurologic symptoms

Jurisdiction	Resource web page	Types of resources available for health care providers
		○ altered sense of taste and smell ○ general post–COVID-19 condition
Saskatchewan	[COVID-19 Repository: Long COVID](#)[18]	• Published reports on post–COVID-19 condition • Additional educational resources
Canada-wide	[Long COVID-19: A Primer for Cardiovascular Health Professionals](#)[19]	Guidance related to cardiac complications including: • investigations • treatment • care approaches

Resources for Clinic and/or Care Model Development

We identified 11 Canadian resources related to the development of clinics for post–COVID-19 condition. Most of these resources identify, analyze, and report findings on data related to models of care, clinics, and management of patients experiencing post–COVID-19 condition. The resources were informed by both Canadian and internationally developed guidance. Many of these resources provide summaries of the available evidence, and some groups have developed their own recommendation frameworks for care. For example, work produced by the COVID-19 Evidence Synthesis Network includes briefing notes on numerous topics related to post–COVID-19 condition, such as evidence surrounding the development, implementation, and funding of clinics for post–COVID-19 condition. Table 3 provides a summary of the resources available as well as a description of their main purpose. Similar to the resources provided for education, awareness, and training of health professionals, this is not an exhaustive or comprehensive list of all resources for the development of post–COVID-19 clinics and/or models of care.

Table 3: Summary of Resources for Clinic and/or Care Model Development

Group (date)	Main purpose(s) of resource
[Strategy for Patient-Oriented Research](#) (December 2021)[10]	To provide updated evidence on the care models for people living with post–COVID-19 condition
[COVID-END](#) (May 2021)[20]	To provide an overview of evidence about symptom management and models of care for people living with post–COVID-19 condition
[COVID-END](#) (April 2021)[21]	To provide an overview of evidence about the development, implementation, and funding of clinics for post–COVID-19 condition across jurisdictions
[COVID-19 Evidence Synthesis Network](#) (April 2021)[22]	To provide a summary of the development, implementation, and funding of clinics for post–COVID-19 condition
[COVID-19 Evidence Synthesis Network](#) (April 2022)[23]	To provide a summary of the assessment and treatment of post–COVID-19 condition including types of care models used
[COVID-19 Evidence Synthesis Network](#) (July 2021)[24]	To provide a summary of rehabilitation care models and rehabilitation interventions for people experiencing symptoms of post–COVID-19 condition
[Long COVID Working Group, Saskatchewan Health Authority](#) (July 2021)[25]	To recommend a model of care for post–COVID-19 condition for implementation in Saskatchewan

Group (date)	Main purpose(s) of resource
[Long COVID Working Group, Saskatchewan Health Authority](#) (August 2021)[26]	• To provide an overview of the prevalence of post–COVID-19 condition and its effect on the health care system • To present the models of care best suited to Saskatchewan • To identify educational and support needs for people affected by post–COVID-19 condition • To identify areas for research about post–COVID-19 condition
[COVID-19 Evidence Support Team, Saskatchewan Health Authority](#) (June 2022)[27]	To examine efforts and care pathways being used to address post–COVID-19 condition nationally and internationally
[INESSS](#) (March 2022)[28]	To provide an overview on the organization of care and services for the prevention of post–COVID-19 and management of people experiencing post–COVID-19 condition
[Post COVID-19 Rehabilitation Response Taskforce, Alberta Health Services](#) (March 2021)[29]	To describe the developed Post COVID-19 Rehabilitation Response Framework with special attention to the tools and resources needed to support patients and providers across 3 different care pathways

INESSS = Institut national d'excellence en santé et services sociaux.

Limitations

This Environmental Scan aimed to provide an overview of the current landscape of specialized post–COVID-19 condition clinics operating across Canada and the resources developed by Canadian jurisdictions to improve education, awareness, and training of health professionals about post–COVID-19 condition. Although this scan strived to capture as much information as possible, it is not meant to be a comprehensive review on the topic. As such, not every clinic or resource that exists in Canada is included in this scan. For instance, all survey responses provided information about public clinics except for 1 clinic. However, there are likely numerous private clinics for post–COVID-19 condition that have been established but were not captured by this scan. Furthermore, because there were no responses to the survey from 2 jurisdictions, there are gaps in the data and the results. Additionally, the information from the survey results is based on the personal opinions, experiences, and perspectives of the respondents about specialized clinics for post–COVID-19 condition. Some of the survey respondents may not be aware or have access to the information sought out in the survey, therefore the results may not be entirely accurate or representative of the clinics and the current Canadian landscape. However, we attempted to mitigate this limitation by inviting participants from all Canadian jurisdictions and by using targeted selection and snowballing techniques to reach those who are most knowledgeable about specialized post–COVID-19 condition clinics. Note that although this scan only sought information on clinics within Canada, the size of Canadian jurisdictions and their resources to address post–COVID-19 condition highly variable. As a result, it may not be feasible for the jurisdictions that do not currently have clinics to develop future clinics with the same characteristics noted in this scan. However, the findings can still serve as a starting point. Finally, the post–COVID-19 condition landscape and associated specialized clinics are changing rapidly. As a result, the information collected at the time of this survey may not be representative of the landscape in the future. Updates to this Environmental Scan may be beneficial to ensure that notable changes are captured. Furthermore, building off the knowledge collected from this Environmental Scan and the feedback received, any future updates should include

equity-focused questions, which we did not ask in this survey (e.g., questions about services for Indigenous groups, support for rural or remote populations, access to clinics for other equity-deserving groups).

Conclusions and Implications for Decision- or Policy-Making

The aim of this Environmental Scan is to provide a current overview of the range and scope of both specialty clinics and available resources for health care professionals about post−COVID-19 condition in Canada. We obtained the information through a survey and a limited search of the grey literature. Targeted stakeholders familiar with specialty clinics for post−COVID-19 condition in Canada completed the survey and provided information and their insights and experiences. This Environmental Scan is part of a wider program of focus for CADTH to produce a collection of work on post−COVID-19 condition that relates to the prevention, diagnosis, classification, and treatment of the condition.

According to the survey results, specialized clinics for post−COVID-19 condition have been established or are in development in 5 Canadian jurisdictions. These clinics were characterized as units, coordinated efforts, programs, general chronic care support, and provincial care frameworks or networks. Six Canadian jurisdictions do not presently have clinics. We did not receive survey responses from 2 jurisdictions. Established clinics and clinics in development varied in their structural characteristics, operational characteristics, and program development and quality improvement activities.

The survey responses related to structural characteristics indicated that clinics are usually located in urban centres, are funded by their respective ministries of health, vary greatly in the length of time they have been operational, and often have hospital and/or academic affiliations. These clinics are staffed by both clinical and nonclinical personnel and usually serve adult populations who meet the clinical case definition for post−COVID-19 condition. The number of people served and the wait times to access these clinics vary substantially across clinics. Although our survey did not capture equity-related data and considerations, there is a need to ensure that clinics are accessible to and serve people with diverse lived experiences, backgrounds, and care needs.

In terms of operational characteristics, clinics typically take an interdisciplinary and/or multidisciplinary approach to care, using several guiding principles to inform clinic operations, with patient-centred care, education, and evidence-based care cited most often. The care components most widely used are virtual health care, patient needs assessments, referral systems, and follow-up systems. A wide variety of screening and symptom assessment tools as well as diagnostic tools and tests are used across the clinics, and the treatments provided are primarily medical, psychological, and social in nature.

The type of program development and quality improvement activities that clinics engage with include data collection and reporting, research and analysis of patient outcomes, evaluations to assess intervention outcomes, and economic impact evaluations. The frequency of engagement in these activities varies; data collection and reporting and research and analysis on patient outcomes occur in the greatest number of clinics and economic impact evaluations occur in the fewest number of clinics.

Jurisdictions without established clinics varied in their approaches to assessing long-term investments for post–COVID-19 condition. Some jurisdictions are in discussions about approaches to clinic implementation, whereas others have allocated resources to the prevention of post–COVID-19 condition through focused efforts on acute COVID-19. Finally, partnerships between jurisdictions may be possible and patients can be referred to clinics outside of their region. Given these different approaches, health care decision-makers may also consider methods for addressing post–COVID-19 condition that can facilitate ongoing shared learning and processes that can allow for interjurisdictional services.

Resources developed by Canadian jurisdictions to improve education, awareness, and training of health professionals about post–COVID-19 condition were highlighted by 8 resource web pages. Numerous types of resources have been developed, including materials to inform referrals, screening and assessment of symptoms, and patient management strategies. Educational materials for health providers are also available, often presented in the form of learning modules, fact sheets, and general literature. Additionally, there are several resources available related to the development of clinics or models of care for post–COVID-19 condition, which provide summaries of available evidence and guidance for future direction.

The findings presented in this Environmental Scan can serve as guidance to policy- and decision-makers across Canada who may be in the process of, or considering, developing specialized clinics for post–COVID-19 condition. The findings provide insight into characteristics of established clinics. They highlight common care components, such as patient-centred care or virtual health, which may be successful methods for providing care to individuals experiencing symptoms of post–COVID-19 condition. For jurisdictions that might be looking to establish clinics of their own, the findings presented in this report may identify examples or ideas of clinic characteristics that would suit the needs and contexts of their respective jurisdiction.

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Appendix 1: Survey Questions

Note that this appendix has not been copy-edited.

Table 4: Survey Questions

Categories of interest	Area of focus	Questions
Specialized Post–COVID-19 Clinic Structural Characteristics	Setting/ Location	City/s and province
		Other information relevant to the clinic setting (e.g., urban/rural, both; academic setting)
		Are there other specialized post–COVID-19 clinics in your jurisdiction/province? If so, how many? (Indicate number)
	Length of time clinic has been operational	Date of set-up (month/year) or expected date of implementation (e.g., pilot program not yet implemented)
		How long has the clinic been operational? (number of years/months)
	Funding mechanisms	How is the clinic funded? (i.e., who funds the clinic, and via which mechanisms?)
	Affiliations	If any, indicate affiliations with: • hospitals (e.g., outpatient, rehabilitation, primary care unit, COVID-19 unit); if any, describe what type of affiliation • primary care practices/role of primary care; if any, describe what type of affiliation • academic institution (e.g., academic hospital, academic research centre); if any, describe what type of affiliation
	Staffing	Type and total number of health care professionals involved (i.e., primary care providers, secondary care providers)
		Type and total number of nonclinical staff involved (e.g., social workers, counsellors, physiotherapy)
	Population served	Age (e.g., adults only, adults and children)
		Number of clients served
		Referral criteria
		Exclusion criteria
Specialized Post–COVID-19 Clinic Operational Characteristics	Guiding principles	Guiding principles informing clinic operations (if any, please indicate which ones). For example, integrated care, patient-centred care, evidence-based care, self-management, shared care, patient education, continuity/coordination of care, case management, to name a few.
	Interdisciplinary or Multidisciplinary approach	Type and extent of interdisciplinary or multidisciplinary approach (if any). Please describe.
	Care components	Which of the following care components are present at your clinic? Indicate with a X in the first column if any of the listed components are present and describe the characteristics of the component in the following column:

Categories of interest	Area of focus	Questions
		Virtual health components
		Standardized symptoms assessments
		Referral system (e.g., via primary care, via specialist, self-referral)
		Integrated referral, integrated care pathway
		Follow-up system (e.g., Which patients attend follow-up? When is it initiated?)
		Home-based care
		Social determinants assessment
		Patient needs assessments
		Other (if any, please indicate what other components of care are present at the clinic)
		Indicate treatments provided (e.g., rehabilitation, pain management, respiratory)
	Treatments	Screening and assessment tools (if any, please indicate which ones)
	Tools	Diagnostic tools (if any, please indicate which ones)
		Is data collected and reported? If yes, what data is collected and how is it reported? Please describe.
Specialized Post–COVID-19 Clinic Program Development and Quality Improvement Activities	Research and evaluation	Is research or analysis conducted to assess patient outcomes? If yes, what research/analysis is conducted? Please describe.
		Are evaluations to assess intervention outcomes conducted? If yes, what evaluations are conducted? Please describe.
		Are economic impact evaluations conducted? If yes, what evaluations are conducted? Please describe.

Appendix 2: Information About Survey Respondents

Note that this appendix has not been copy-edited.

Table 5: Information on Survey Respondents

Province and territory	Organizations represented by survey respondents
Alberta	• University of Alberta • Alberta Health Services
British Columbia	Post-COVID Interdisciplinary Clinical Care Network, Provincial Health Services Authority
Manitoba	Winnipeg Regional Health Authority
New Brunswick	Department of Health, Government of New Brunswick
Newfoundland and Labrador	Memorial University of Newfoundland
Northwest Territories	Northwest Territories Health and Social Services Authority
Ontario	• Rehabilitative Care Alliance • Sunnybrook Research Institute, Sunnybrook Health Sciences Centre • The Ottawa Hospital • University Health Network • University of Toronto
Prince Edward Island	Health PEI
Quebec	• Centre hospitalier de l'Université de Montréal • CISSS de Chaudière Appalaches • CISSS de la Montérégie-Ouest • CISSS de l'Outaouais • CIUSSS Centre-Ouest Montréal • CIUSSSE-CHUS
Saskatchewan	Saskatchewan Health Authority
Yukon	Department of Health and Social Services, Government of Yukon

CHUS = centre hospitalier universitaire de Sherbrooke; CISSS = centre intégré de santé et de services sociaux; CIUSSS = centre intégré universitaire de santé et de services sociaux; CIUSSE = centre intégré universitaire de santé et de services sociaux de l'Estrie; PEI = Prince Edward Island.

Appendix 3: Additional Tables

Table 6: Summary of Specialty Clinic Characteristics for Post–COVID-19 Condition[a]

Characteristics	Alberta	British Columbia	New Brunswick	Ontario	Quebec
Clinics reported, n	3	1 network of clinics	2 (1 clinic, 1 network of clinics)	11	8
Type(s)	A unit, a coordinated effort, a program	A program, other (network)	A coordinated effort, a unit	A coordinated effort, general chronic care support, a unit	A coordinated effort, a program, a unit
Location(s)	Edmonton, Calgary	Vancouver, Abbotsford, Surrey, Kamloops, Victoria, Northern Health	Province-wide, Saint John	London, Oakville, Ottawa, Toronto	Montérégie-Ouest, Montreal Sherbrooke
Time operational	19 to 29 months	29 months	0 (in development) to 24 months	<12 months to 25 months	0 (in development) to 30 months
Funding	Alberta Health Services	Provincial Health Services Authority, Medical Services Plan for B.C.	Medicare	Ontario Health Insurance Plan, Ministry of Health, Affiliated hospital funding, in-kind resources	Ministère de la santé et des services sociaux
Affiliations	• Hospital • Primary care	• Hospital • Primary care • Academic institution	Hospitals	• Hospital • Primary care • Academic institution	• Hospital • Primary care • Academic institution
Type of staff	• Physician (various specialties) • Physiatrist • Nurse practitioner • Registered nurse • Social worker • Respiratory therapist • Physiotherapist • Occupational therapist	• Physician (various specialties) • Registered nurse • Social worker • Physiotherapist • Occupational therapist	NR	• Physician (various specialties) • Nurse practitioner • Registered nurse • Physiatrist • Physiotherapist • Occupational therapist • Dietician • Psychologist	• Physician (various specialties) • Registered nurse • Nurse coordinator • Physiotherapist • Occupational therapist • Social worker • Administrative professional

Characteristics	Alberta	British Columbia	New Brunswick	Ontario	Quebec
	• Administrative professionals			• Respiratory therapist • Speech-language pathologist • Social Worker • Community health navigator	
Patient age	Adult	Adult	Any age	16 years and older	Adult
Guiding principles	• Integrated care • Patient-centred care • Family-centred care • Evidence-based care • Self-management • Patient education • Case management	• Integrated care • Patient-centred care • Evidence-based care • Self-management • Shared care • Patient education • System navigation • Care coordination • Standardization • Tiered services	• Integrated care • Patient-centred care • Patient education • Self-management • Guided care	• Evidence-based care • Patient-centred care • Patient education • Self-management	• Integrated care • Evidence-based care • Patient-centred care • Shared care • Patient education • Continuity and coordination of care • Case management • Tiered services • Self-management
Care components	• Virtual health • Referral system • Integrated referral/ integrated care pathway • Follow-up system • Social determinants assessment • Patient needs assessment	• Virtual health • Referral system • Follow-up system • Patient needs assessments • Other: education	• Virtual health • Referral system • Integrated referral/ integrated care pathway • Follow-up system • Patient needs assessments	• Virtual health • Referral system • Follow-up system • Social determinants assessment • Patient needs assessment • Other: education, peer support	• Virtual health • Referral system • Integrated referral/ integrated care pathway • Follow-up system • Patient needs assessments

Note: This appendix has not been copy-edited.

[a]All data reported in this table corresponds to the answers received at the time of survey administration (November 2022).

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Table 7: Care Components Present in Specialty Clinics for Post–COVID-19 Condition

Jurisdiction (number of clinics)	Virtual health components	Referral system	Integrated referral, integrated care pathway	Follow-up system	Home-based care	Social determinants assessment	Patient needs assessment	Other
Alberta (n = 3)	Yes	Yes	Yes	Yes	No	Yes	Yes	No
British Columbia (n = 1 network)	Yes	Yes	No	Yes	No	No	Yes	Yes (Access to research and education, group education)
New Brunswick (n = 2)	Yes	Yes	Yes	Yes	No	No	Yes	Yes (In development)
Ontario (n = 11)	Yes	Yes	No	Yes	No	Yes	Yes	Yes (Education, peer support)
Quebec (n = 8)	Yes	Yes	Yes	Yes	No	No	Yes	No

Note: The care components listed are not necessarily present at every clinic or network of clinics in each jurisdiction. Rather, a "yes" is indicated if a care component is present in at least 1 clinic or network of clinics in a jurisdiction.

Table 8: Screening Symptom Assessment and Diagnostic Tools Used in Specialty Clinics for Post–COVID-19 Condition

Tool type	Tools and tests
Screening and symptom assessment tools	- C19-YRS - CADE-AID - COPM - Cough VAS - DSQ - EQ-5D-5L - EQ VAS - FACIT Fatigue Scale (Version 4) - FSS - GAD-2 - GAD-7 - Modified FGA - MFIS - mMRC dyspnea scale - Modified Borg RPE Scale - PCFS scale - PC-PTSD-5 - PHQ-2 - PHQ-8 - PHQ-9 - SGRQ - Sit-to-Stand Test - Time static balance testing - UCSD SOBQ - WHODAS 2.0
Diagnostic tools and tests	- Blood work - Chest X-ray (CXR) - Lab work - Albumin - Brain natriuretic peptide - Complete blood count - Ferritin - Lactate dehydrogenase - Liver Function Test - Troponin - Urine albumin-creatinine ratio - MRI - Pulmonary function testing (PFT)

Tool type	Tools and tests
	• Stress Test • TorCA (Toronto Cognitive Assessment) • Urinalysis with microscopy • 1MWT • 6MWT

C19-YRS = COVID-19 Yorkshire Rehabilitation Scale; CADE-AID = CAGE Adapted to Include Drugs; COPM = Canadian Occupational Performance Measure; DSQ = DePaul Symptom Questionnaire; GAD = general anxiety disorder; FACIT = Functional Assessment of Chronic Illness Therapy; FGA = Functional Gait Assessment; FSS = fatigue severity scale; mMRC = modified medical research council; MFIS = modified fatigue impact scale; MWT = minute walking test; PCFS = Post-COVID Functional Status; PC-PTSD-5 = primary care post-traumatic stress disorders for DSM-5; PHQ = patient health questionnaire; RPE = rate of perceived exertion; SGRQ = St. George's Respiratory Questionnaire; UCSD SOBQ = University of California, San Diego Shortness of Breath Questionnaire; VAS = visual analogue scale; WHODAS = WHO Disability Assessment Schedule.

Table 9: Program Development and Quality Improvement Activities Present in Specialty Clinics for Post−COVID-19 Condition

Jurisdiction (number of clinics)	Data collection and reporting	Research and analysis to assess patient outcomes	Evaluations to assess intervention outcomes	Economic impact evaluations
Alberta (n = 3)	Yes	Yes	Yes	Yes
British Columbia (n = 1 network)	Yes	Yes	Yes	Yes
New Brunswick (n = 2)	No	No	Yes	No
Ontario (n = 11)	Yes	Yes	Yes	Yes
Quebec (n = 8)	Yes	Yes	Yes	Yes (in development)

Note: The program development and quality improvement activities are not necessarily present at every clinic or network of clinics in each jurisdiction. Rather, a "yes" is indicated if activities are present in at least 1 clinic or network of clinics in a jurisdiction.