

Development of a Novel Care Rehabilitation Pathway for Post-COVID Conditions (Long COVID) in a Provincial Health System in Alberta, Canada

Development of a Post-COVID Rehabilitation Pathway

Health Policy

Case Report

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ABSTRACT

Objective. The purpose of this study was to describe the development and composition of a codesigned, multidisciplinary, integrated, systematic rehabilitation framework for post-COVID conditions (PCC) that spans the care continuum to streamline and standardize rehabilitation services to support persons with PCC in Alberta, Canada.

Methods. A collaborative, consensus-based approach was used, involving 2 iterative provincial taskforces in a Canadian provincial health system. The first taskforce (59 multidisciplinary stakeholders) sought to clarify the requisite facets of a sustainable, provincially coordinated rehabilitation approach for post-COVID rehabilitation needs, based on available research evidence. The second taskforce (129 multidisciplinary stakeholders) translated that strategy and criteria into an operational framework for provincial implementation. Both taskforces sought to align with operational realities of the provincial health system.

Results. The summation of this collaborative, consensus approach resulted in the Provincial Post COVID-19 Rehabilitation Response Framework (PCRFR). The PCRFR includes 3 care pathways across the care continuum, specifically targeting in-hospital care, continuing care, and community-based care, with 3 key elements: (1) the use of specific symptom screening and assessment tools to systematically identify PCC symptoms and functional impairments; (2) pathways to determine patients' rehabilitation trajectory and to guide their transition between care settings; and, (3) self-management and education resources for patients and providers.

Conclusion. The PCRFR aligns with international mandates for novel codesigned, multidisciplinary approaches to systematically address PCC and its myriad manifestations across the care continuum. The PCRFR allows for local adaptation and highlights equity considerations allowing for further spread and scale provincially, nationally, and internationally.

Impact. The PCRf is a framework for health systems to ensure consistent identification, assessment and management of the rehabilitation needs of postacute and chronic PCC. Rehabilitation providers and health systems can build from the PCRf for their local communities to reduce unmet needs and to advance the standardization of access to rehabilitation services for persons with PCC.

KEYWORDS: Health Care Reform, Health Services Administration, Rehabilitation, Critical Pathways

[H1] Introduction

As of October 4, 2021, 230+ million people worldwide have survived COVID-19.¹ The World Health Organization (WHO) expects 10%–20% of COVID-19 survivors to experience prolonged signs and symptoms after acute infection.² A meta-analysis (n=36 studies) found that the incidence of these Post-COVID conditions (PCC) at 4–12 weeks (post-acute phase) and 12+ weeks (chronic phase) post-diagnosis was 83% and 56%, respectively.^{3,4} The literature is ever-evolving given the recency of this virus along with the inability to clarify long-term disease impact. PCC are consistently recognized as drivers of health, and particularly rehabilitation, needs by patients and families⁵; clinicians and researchers^{3,4,6,7}; as well as health systems and health organizations.⁸⁻¹⁰

PCC are common, diverse and pervasive: their manifestation can often be supported through rehabilitation, while medical management is less-consistently required.^{3, 11-16} PCC may affect multiple organ systems, as well as cognitive and mental health outcomes.^{4, 7, 17, 18} The most prevalent symptoms, in both post-acute and chronic phases, include fatigue, general pain, sleep disturbances, shortness of breath, anxiety and depression.³ The diversity in presentation and severity is clear, with a systematic review finding at least 100 different symptoms.³ PCC affects hospitalized and non-hospitalized COVID-19 survivors, although the former may be at higher risk of developing PCC.^{3, 19}

The diversity of PCC implicates services throughout the care continuum in patient care, including rehabilitation.^{4, 20-22} Despite its high prevalence and effects on wellbeing and functionality, frameworks guiding PCC rehabilitation are sparse; resulting in unstandardized and uncoordinated care impacting patients' and families' health and quality of life. In February 2021, the WHO urged health systems to better prepare for patients with PCC by developing patient codesigned, multidisciplinary approaches for assessment and management; creating novel care pathways; and developing appropriate rehabilitation and online resources.¹⁰

In this paper, we describe the development and structure of a codesigned, multidisciplinary, integrated, systematic rehabilitation framework for PCC that spans the care continuum, including continuing care, and advances screening, assessment, and management of PCC rehabilitation needs.

[H2] Current evidence

A July-2020 rapid evidence review (n= 18 studies on health service use) demonstrated that COVID-19 survivors use health services in and beyond the post-acute phase, including emergency departments (ED), acute care, home care, outpatient specialty clinics, primary care, rehabilitation and telehealth lines.¹⁹ The mean (standard deviation) use was at 13.44 (6.16) weeks post-diagnosis. The prevalence of health service utilization post-acute COVID-19 ranged from 16%–40% up to 9 weeks post-discharge²³; 29.4% for re-hospitalization across 20-weeks post-discharge²⁴; 8.5% re-admission rate if sent home with supplemental oxygen²⁵; or 10% re-hospitalizations, 36% visited their general practitioner, and 7% called a medical hotline at least once.²⁶ Health system data from Alberta, Canada reveal that, between January and July 2021, an average of 19% of persons hospitalized due to COVID-19 visited the ED within 30 days post-discharge, while 4.9% were re-admitted to hospital and 15.1% died during that period.²⁷ This is around four times higher than the 2018 Alberta data where the overall post-discharge 30-day ED visit rate for all diagnoses was ~8%.²⁸ There may be inefficiencies and inadequacies in the current, non-standardized approaches to supporting patients with PCC. ED visits related to PCC (eg, shortness of breath, fatigue and cognitive issues) may be avoided with more

patient-centered management and rehabilitation resources, and better post-discharge transition planning, including robust self-management tools and follow-up with primary care.¹⁰

Evidence on the vocational consequences of PCC is emerging based on a rapid evidence review (n=9 studies on return to work).¹⁹ On the basis of self-reported survey data, patients with PCC experienced reduced workforce participation (eg, early retirement) (31%–54%), absenteeism (eg, missed days) (48%–61%) and presenteeism (eg, at work but less productive) (25%–69%).^{5, 19, 29-31} The prevalence of these work-related issues was statistically lower at 6 months compared to 3 months post-diagnosis (n= 3 studies, 1 with administrative data).^{5, 19, 29, 31}

Early in the pandemic, organizations advocated for early access to rehabilitation, ideally beginning in hospital and following patients across the care continuum.^{6, 7, 20} Rehabilitation can address many PCC symptoms, whether respiratory (eg, inspiratory muscle training, airway clearance techniques); musculoskeletal (eg, balance, strength training), neurological (eg, cognitive and motivational exercises), or psychological (eg, counselling, therapy).^{17, 20, 22} Comprehensive, multidisciplinary, integrated pathways for rehabilitation are required to optimally screen, assess and manage patients with PCC across the care continuum.³²

In the UK, the Leeds Teaching Hospital NHS Trust codesigned a multidisciplinary, integrated rehabilitation pathway for those with PCC using a three-tier model of management.³² This model includes (1) specialist multidisciplinary team service; (2) community therapy teams; and (3) self-management with entry criteria and recommended interventions for each level.³² This 3-tiered pathway originated with a focus on hospitalized COVID-19 survivors but includes non-hospitalized COVID-19 survivors; relies on centralized tele-triage interactions for assessment; has a structured longitudinal outcome measure set (baseline, 8 weeks, 6 months); and, had novel, protected funding to increase dedicated professional resources (ie, community nurses, therapists and specialist clinicians available from 0.2 to 2.0 full-time equivalents). This model emphasizes primary care, specialty clinics, and COVID-19 survivors living at

home. Peer support is described as a future direction of the pathway, but patient involvement in pathway development is unclear.

Leeds' 3-tiered pathway is a critical advancement of the WHO mandate for novel care pathways, multidisciplinary approaches, and rehabilitation assessment and management that leverage online resources. However, further work is required as health systems globally consider their approaches to caring for PCC patients. New strategies need to address remaining gaps and expose key facets, such as approaches to patient and key stakeholder codesign, and pathway development amidst no protected funding. Important considerations include care of COVID-19 survivors who do not live at home; and integrated care pathways that include the full care continuum where post-acute sequelae and PCC may arise. Local engagement also facilitates implementation.

[H1] Methods

A collaborative, consensus-based approach was used, involving two iterative provincial taskforces in a provincial health system in Alberta, Canada. The first taskforce (TF1-Approach) sought to clarify the requisite facets of a sustainable, provincially-coordinated rehabilitation approach for post-COVID rehabilitation needs (Suppl. Tab.).²² The second taskforce (TF2-Framework) translated the strategy and criteria of TF1-Approach into an operational framework for province-wide implementation across the health system.³³ Both taskforces sought to embed this work into the operational realities of the organizational context. The work of the taskforces (described below) was guided by senior leadership sponsors and co-chairs; multidisciplinary stakeholder membership; environmental scans of the literature on relevant models and care practices; as well as insights from leaders and groups managing various aspects of the pandemic response.

[H2] Organizational Context

Alberta Health Services (AHS) is Canada's first and largest province-wide, fully-integrated, single-payer health system, responsible for delivering health services to nearly 4.4 million people.³⁴ Over 850 facilities across the province offer AHS programs

and services, including hospitals, clinics, continuing care facilities, community health sites, home care, public health, specialized centers for cancer and mental health³⁴, as well as inpatient and community rehabilitation.

AHS provides provincial oversight, while allowing for variations in the operations of healthcare services based on geographical zones (Fig. 2). The primarily urban Zones (Calgary & Edmonton Zones) are demographically distinct from the primarily rural Zones (North, South & Central Zones): the former versus the latter include 70% vs. 30% of Albertans; and, include 28%–31% vs. 7%–9% identified as a visible minority, respectively.³⁵⁻³⁹ All Zones are 49%–50% female. As geography, sex, and ethnicity can affect the experience of PCC, these considerations informed both taskforces in developing the framework to systematically address PCC rehabilitation needs.

[H2] *TF1-Approach: Codesigning the Approach to Sustainable Access & Use of Rehabilitation for PCC*

TF1-Approach convened from May to October 2020 to develop a sustainable, provincially-coordinated rehabilitation approach to better target the spectrum of PCC rehabilitation needs; better support patients recovering from COVID-19; reduce demand on acute care; and, improve efficiency.²²

Sponsorship & Membership. At AHS, sponsorship by executive provincial leadership (Vice-President-level) is established alongside taskforce initiation. This sponsorship ensures oversight and promotes provincial uptake at the later implementation stages. Taskforce co-chairs represent senior organizational administrative leaders and oversee operations. The TF1-Approach co-chairs represented leadership from rehabilitation operations, the provincial allied health professions portfolio, and a strategic clinical network focused on innovation and implementation facilitation in neurosciences, rehabilitation and vision services.⁴⁰

The co-chairs established the multidisciplinary stakeholder membership of TF1-Approach and its four working groups through invitation based on role as well as geographic and responsibility representation.²² TF1-Approach included 53 stakeholders

representing patient and family advisors (n= 2), front-line clinicians, researchers, as well as operational and administrative leadership from across the care continuum (ie acute care, community care including outpatient rehabilitation, continuing care, primary care). Intentional diversity ensured representation of primary care, seniors health, allied health leadership, clinical operations, strategic clinical networks, communications, critical care, internal medicine, mental health, public health, rehabilitation, telehealth, and quality improvement. The professions represented including dietetics, medicine (including specialists in internal medicine, physiatry, primary care, pulmonary medicine, and public health), mental health, nursing, occupational therapy, physiotherapy, respiratory therapy, social work, and speech language pathology.

Guiding Principles. TF1-Approach addressed the full care continuum, and its inherent transition points, in its strategy development, including acute care (eg, critical care, acute medicine), inpatient and outpatient rehabilitation (eg, day programs, community rehabilitation), subacute care, continuing care (eg, long-term care, supportive living, and homecare), and primary care. Five guiding principles and nine assumptions were central to decision-making and scope management (Tab. 1). The guiding principles included integration, avoiding duplication, patient-centered care, sustainability, and integration of existing resources.

Working Group Activities. The four TF1-Approach working groups, each with clinical-operational co-chair dyads, separately addressed recommendations for (1) screening for rehabilitation needs; (2) early rehabilitation assessment and treatment; (3) discharge and transition planning for coordinated patient flow; and (4) criteria for longitudinal follow-up of patient functioning. These four areas attempted to cover the care continuum. Each working group examined key pathways and frameworks; conducted literature reviews; and, consulted with local and international experts on their content area. Before and during the pandemic, parallel provincial AHS initiatives created pathways and resources to guide care, especially in transitions between hospital and home,⁴¹ as well as in care provision in primary care and specialty clinics for patients with COVID-19.⁴² These pathways were building blocks to inform content as well as promote

introduction and sustainability of taskforce recommendations. Working groups conducted literature reviews and environmental scans to determine best practices, available services, and programs as well as relevant tools for screening, rehabilitation interventions, transitions, and long-term follow-up. For example, a rapid scoping review (n= 39 articles) informed methodologies used to longitudinally follow-up persons with COVID-19 (unpublished). The scoping reviews involved search strategies developed and conducted by health librarians; inclusion of 3+ databases; two independent reviewers; two review stages with *a priori* exclusion criteria; structured data extraction; and a narrative synthesis. The scoping reviews informed Working Group discussions and offered starting points for discussion to lead to evidence-informed (rather than evidence-based) strategy development. TF1-Approach convened bi-weekly, while working groups convened weekly, to discuss learnings, develop recommendations, as well as to ensure cohesiveness and limit redundancies across working groups. Working groups were emboldened to develop tools, pathways, and resources specific to their purview; to make decisions using consensus and discussion; and to propose approaches to the TF1-Approach. Working group disagreements or confusion was discussed at the full TF1-Approach bi-weekly meetings, with the co-chairs adjudicating disagreements and finalizing content.

Output Development. The work of TF1-Approach was foundational to understanding PCC needs provincially. TF1-Approach produced 19 recommendations to collectively enable timely, appropriate rehabilitation for adult patients with COVID-19 across the care continuum (Tab. 2). The recommendations distinguished patients who had been hospitalized versus those with no history of hospital stay (non-hospitalized) for COVID-19. The long-term impacts of COVID-19 were very unclear in 2020, but early learnings suggested widespread and diverse rehabilitation implications that required attention. TF1-Approach recommendations fit into existing care pathways and leveraged existing resources to be mostly cost-neutral to the health system.

In brief, these recommendations provided guidance for regular screening at each transition of care of patients. In primary and continuing care, abbreviated screening

questions were recommended for patients with no hospitalization. The screening tools were based on the Leeds Teaching Hospitals NHS Trust instrument: C19-YRS screening tool.²¹ The discharge recommendations included use of a discharge checklist, clear and concise documentation, and guidance around treatment choices and rationale. TF1-Approach provided guidance for targeted screening and subsequent comprehensive rehabilitation assessments, as well special considerations across the care continuum. Longitudinal monitoring was recommended for clinical follow-up of patients using a variation of the C19-YRS at regular time-points; mobilizing telehealth resources; and advancing the availability of data for quality improvement in the evolving pandemic.

[H2] *TF2-Framework: Operationalizing an Integrated, Sustainable Pathway to Identify and Address Rehabilitation Needs for Patients with PCC*

From November 2020 to February 2021, the second taskforce was established and launched to translate the 19 TF1-Approach recommendations into operation using the same guiding principles.³³ TF2-Framework developed an integrated high-level guidance that includes necessary pathways, tools, and supports to determine the level of functional impairment and patient-specific rehabilitation needs post-COVID across the care continuum.³³

Sponsorship & Membership. TF2-Framework sponsorship and mentorship built upon TF1-Approach principles. The taskforce co-chairs represented administrative leadership from Primary Care, AHS Operations, and the strategic clinical network focused on rehabilitation.⁴⁰ TF1-Approach included 129 members, including patients and family advisors (n= 12), clinicians, operational and administrative leadership, and researchers. These multidisciplinary stakeholders represented similar areas as those of TF1-Approach but offered more diverse perspectives within each area.

Working Group Activities. Five working groups addressed the recommendations of TF1-Approach from an area-specific perspective: (1) acute care/inpatient rehabilitation; (2) post-acute/continuing care (ie, inpatient settings for medical or care needs after patient has recovered from acute illness); (3) primary care/community rehabilitation; (4)

patient and provider resources; and (5) longitudinal monitoring & tracking. Working group methods mirrored that of TF1-Approach (ie, examining key pathways and frameworks; conducting literature reviews; and consulting experts). The reviews and consultation spanned provincial, national, and international settings to clarify how health leaders approached the delivery of rehabilitation services including the identification of enablers and barriers; and collaborations with the provincial Workers' Compensation Board, which provided further learnings and context for real-world testing of proposed assessment tools. The working group meetings were augmented with regular meetings between working group and taskforce co-chairs to trouble-shoot issues and potential risks that could impede progress to meet expectations. The working groups considered the 19 recommendations as a starting point, not canon. Not all care areas addressed all recommendations given the evolving nature of the pandemic. For example, given parallel work by provincial teams in developing clinician resources, working group four focused on developing online educational resources for patients and families. The taskforce collaborated with the provincial government to implement a joint initiative: a provincial, retrospective, case-control survey study to explore the association between testing positive for COVID-19 and the reporting of long-term physical, mental health, and psychosocial health outcomes. This provincial study will lead to more effective health service planning, policy, and delivery.

Output Development. Each working group was tasked with developing a tangible, operationalizable framework (including tools, decision supports and resources) necessary to enable care providers to appropriately and systematically determine the degree of functional impairment and corresponding rehabilitation needs of patients with PCC. Integration across the care continuum, feasibility and sustainability for front-line clinicians were key considerations, along with implementation challenges and potential mitigation strategies for specific geographical contexts and particular care areas.

[H2] *Role of the Funding Source*

No additional or unique funding was provided for this work. However, the AHS representatives who developed this funding are publicly funded providers and leaders. Funders played no role in the design, conduct, or reporting of this work.

[H1] Results

The summation of this collaborative, consensus approach resulted in the Provincial Post COVID-19 Rehabilitation Response Framework (PCRF), which was approved by executive.³³ The PCRF provides an integrated high-level clinical pathway that includes the necessary pathways, tools, and supports to determine the degree of functional impairment and patient-specific rehabilitation needs (Fig. 1).³³ The PCRF includes three Care Pathways targeting (a) in-hospital care (ie, acute care, inpatient rehabilitation) (Fig. 2), (b) continuing care (Fig. 3), and (c) community-based care (ie, primary care, outpatient rehabilitation) (Fig. 4). The PCRF guides users to stratify patients into the appropriate rehabilitation service levels to advance appropriate and standardized use of scarce rehabilitation resources.

The PCRF contains four key elements: (a) the use of specific symptom screening (adopted from the C19-YRS)²¹ and assessment tools (Post COVID-19 Functional Status Scale (PCFS))³⁰ across the care continuum to systematically identify PCC symptoms and functional impairments; (b) determination of patients' rehabilitation trajectory and to guide their transition from one care setting to another (eg, from acute care to community); (c) inventory maps of rehabilitation resources across the various geographical zones of the province; and, (d) self-management and education resources.³³ The PCFS allows providers to assess patient-relevant functional limitations on an ordinal scale with distinct cut-points to determine appropriate rehabilitation needs (mild, moderate or high degree) that correspond to universal, targeted or personalized rehabilitation, respectively. Universal rehabilitation includes virtual and online resources for self-management; targeted rehabilitation involves group programs; and personalized rehabilitation entails 1:1 rehabilitation. A rapid review (n=10 articles describing 13 assessment tools) confirmed that the PCFS is the most frequently used, and moderately

validated, PCC assessment tool.¹⁹ The construct validity of the PCFS was found to have a weak-to-strong association between functional status and all domains of quality of life (EQ-5D-5L) ($r: 0.233-0.661$), and to have complementarity between gradual increases of activity impairment (WPAI) and decreases in the functional status (PCFS).³⁰

The PCRf guides healthcare providers to advocate for the use of virtual support as appropriate (eg, tele-rehabilitation/mental health helplines); and ensure systematic handoff of patients' PCC plans of care from acute to primary care teams. They can be used by any community care provider (eg, nursing, allied health, physicians), anytime, and allow for local adaptation. For example, there are templates with embedded links to appropriate resources offered to each of the five AHS Zones that include both rural and urban centers. The Zones can then customize each link to ensure accuracy and relevance for local clinical users.

For hospitalized patients, following screening and assessment, the PCRf recommends the use of a Post COVID-19 Rehabilitation Discharge Checklist to guide discharge of patients from one care setting to the next. Discharge recommendations include referrals to community rehabilitation or ambulatory clinics, as well as medical and rehabilitation call lines, as needed. Discharge criteria consider special or marginalized populations which may have unique needs (eg, pediatrics, Indigenous populations, older adults, incarcerated populations, isolated and rural populations) and social determinants of health (eg, poverty, social isolation). The PCRf recommends that mental health issues be considered in collaboration with provincial mental health programs and appropriate referrals be made. Patient awareness is promoted across the care continuum through PCRf implementation, including mobilization of virtual platforms, that available education and self-management resources offer direct access to rehabilitation professions and nursing, who can answer questions and link to resources in a timely fashion.

[H1] Discussion

The PCRf highlights that the diverse range of PCC symptoms and rehabilitation needs of patients across the multitude of care settings should be considered to fully

support persons who experienced COVID-19. The PCRf aligns with WHO advice to develop and plan such concerted responses to PCC. It meets many criteria espoused by the WHO in a relatively cost-neutral way: it is codesigned, multidisciplinary, focuses on assessment and management, and includes novel PCC-specific care pathways as well as novel rehabilitation and virtual resources. The PCRf incorporates many virtual modalities: websites, telehealth, and video appointments to facilitate direct access to information or allied health professionals as appropriate without costly clinic visits.

The PCRf's focus on identification and referral complements other work organizationally on best practices for rehabilitation of PCC. AHS has published rapid evidence reviews on how to manage 13 categories of potential symptoms of PCC (eg, cardiovascular, neurological, psychiatric, sleep, pulmonary and renal complications).⁴³ This work was complemented by directions from professional organizations early in the pandemic on rehabilitation post-COVID.^{17, 19}

Pathways that move from identification to assessment and management are critical and must consider the full care continuum.⁴⁴ An Italian rehabilitation department described its approach to caring for post-acute and chronic PCC, and indicated the pressing need for specialized clinical standard procedure flow (or clinical pathway).⁴⁴ Standardized pathways for PCC must encompass multiple, diverse entry and referral points, as the PCRf and its incumbent three care pathways have attempted. The PCRf ensures that the realities of continuing care patients and providers are not conflated with those of patients in short-term acute care or living at home.

Diversity is manifest across provincial geographies, across care continuum settings, and across the social determinants of health. The inequitable effects of COVID-19 have been noted, including inequities based on sex (eg, more males hospitalized), and ethnicity (eg, racialized communities, with multi-generational homes, experience higher infection rates).^{24,45-47} A priority of the taskforces and the PCRf was standardization towards equity and appropriateness of health system responses.⁴⁸ The taskforce recommendations, PCRf tools and supports, as well as the provided implementation considerations for local adaptation attempted to raise equity concerns and

considerations. A third taskforce was convened by AHS to support local implementation. Recognized marginalized populations and the social determinants of health were highlighted in PCRf materials, to ensure end-user providers and teams looked to their communities for appropriate modifications and expansions. AHS provided in-kind, immediate translation of the patient resources into 11 languages to advance access and usability (a service that usually requires cost-recovery).

Challenges remain to the full provincial implementation of the PCRf and its included pathways. Awareness and uptake of the PCRf across a health system with 120K+ personnel is daunting, especially given the reach and relevance of the PCRf itself. This is compounded by the lack of provincial operational rehabilitation structure. Communication strategies are critical, but have been challenged by pandemic fatigue, lengthy redeployments of rehabilitation and other health care staff, and competing demands including non-COVID patients with issues that have worsened from neglect during the pandemic. Geographical diversity led to intra-provincial variations in both the impact of the pandemic and numbers of patients with PCC, which accounts for variability in the degree of priority for PCRf implementation. Care transitions must have health care providers knowledgeable of social sector services, for considerations such as homelessness, social isolation, financial insecurity, and access. The PCRf tools and pathways are currently evidence-informed, but the evidence is evolving as should the PCRf. The challenge to the short-term provincial taskforce model used herein is the question of who will continually update the pathway and resource inventory. Finally, it was critical to this cost-neutral initiative to leverage existing care pathways and processes, however this takes time. The PCRf introduces new steps across the care continuum for providers, which can be met with resistance, concerns, and lack of clarity. PCRf development was a significant accomplishment, but its implementation remains the next, challenging step.

[H2] *Limitations*

There were limitations to this work. Given its relatively quick turnaround, patient and family advisors included a mix of those who experienced COVID-19 and those who had experience with the health system for different but related reasons (eg, post-ICU syndrome). The patient voice was present and strong throughout, but not the wholly PCC patient voice. The PCRf was developed with a single provincial health system in mind, and how care is delivered herein. Its translation to two-tiered health systems is unclear. Despite its increasing use, no formal validation of the specificity of the PCRf has been undertaken. A strong point of the PCRf is the recommendations for novel virtual and online resources, albeit their validation is ongoing, with a significant anticipated barrier being disparities in internet access and the digital gap, especially in remote and rural communities and vulnerable populations (ie, affected by poverty and homelessness). The authors believe other health systems can build off the PCRf and personalize for their local differences. The PCRf is intended for use within a province which itself has geographically diversity in population and available health resources.

Future research is required to further advance understanding on the role and utility of multidisciplinary pathways unique to PCC in health systems. As our understanding continues to evolve around this pandemic and its implications, rigorous understanding is required on the prevalence, course, and impact of PCC for patients. This will complement understanding on the actual utility of these systematic pathways. AHS will evaluate the implementation of the PCRf by early adopters to advance this gap. Rigorous research on the effectiveness of specific rehabilitation interventions in the management of particular symptoms of PCC will allow refinement of the PCRf and related pathways developed in other jurisdictions.

During a pandemic that predominantly focused on acute care and acute implications, this work highlights the value of rehabilitation, and that rehabilitation is broader than allied health professions. The pandemic introduced great disruptions to health services delivery, including rehabilitation; frameworks such as the PCRf provide clear guidelines for patient and assessment referral that are even more critical.

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Disclosures

The authors completed the ICMJE Form for Disclosure of Potential Conflicts of Interest and reported no conflicts of interest.

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Tables

Table 1. Guiding Principles & Assumptions of TF1-Approach^a

Guiding Principles
<ul style="list-style-type: none"> (a) Based on evidence and principles of patient-centered care (b) Provincial in scope and engaging multiple disciplines across all 5 geographic Zones of AHS (c) Considers unique needs of diverse populations, but focused on adult patients (d) Ensures sustainability through leveraging available capacity, including existing pathways (eg, the Presumed/Confirmed COVID-19 Positive Primary Care Pathway). (e) Identifies patient flow across the care continuum (f) Generates information on long-term rehabilitation needs to inform clinical care planning.
Assumptions
<ul style="list-style-type: none"> (g) Recommendations were founded on core values: AHS Values, patient/family centered care, quality and safety, quadruple aim, collaborative, and professional practice. (h) Recommendations recognize that rehabilitation requires a wide variety of professions: allied health, nursing, and medicine. (i) Three focal transition points were hospital to home or continuing care; home/community to rehabilitation; and continuing care to rehabilitation. (j) The primary aim of long-term follow-up is to identify clinical need for further rehabilitation. The secondary aim considered data collection for quality improvement. (k) Referrals triggered by rehabilitation screening are suggestions and do not replace individualized assessment and clinical recommendations.

- (l) Rehabilitation screening of hospitalized patients with COVID-19 occurs in non-intensive care settings. Unique considerations are required for patients in need of critical care.
- (m) Comprehensiveness and feasibility must balance to recognize survey time burden and AHS' evolving capacity of rehabilitation programs.
- (n) By consulting key operational frameworks, there must also be alignment with key stakeholders with existing COVID-19 pathways, especially for implementation.
- (o) The recommendations must be flexible. Rehabilitation needs post-COVID19 vary across recovery stages, between patients, and amidst evolving program capacity.

^aAdapted with permission from Alberta Health Services (Calgary, AB, Canada) from

<https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-post-covid-rehab-response-framework-summary.pdf>.⁴⁹

Table 2. Screening for Rehabilitation Needs Across the Care Continuum^a

Screening for Rehabilitation Needs		
Recommendation	Relevant Pathway(s)	Recommended Tools and Resources
1. Hospitalized patients with COVID-19 will be screened for potential rehabilitation needs at each transition of care.	<ul style="list-style-type: none"> • Acute Care/ Inpatient Rehabilitation 	<ul style="list-style-type: none"> • C19 YRS • PCFS • AHS COVID-19 Safe Discharge Checklist • My Discharge Checklist
2. Patients receiving services in post-acute and those living in the community with COVID-19 symptoms will be screened for potential rehabilitation needs, as required.	<ul style="list-style-type: none"> • Post-acute • Continuing Care • Primary Care/Community Rehabilitation 	<ul style="list-style-type: none"> • Recommended Screening Tool for COVID-19 Patients • C19 YRS • PCFS • Health Link®/Rehabilitation Advice Line (RAL), Mental Health Advice Line • Screen for Social Determinants of Health
Assessment to Determine Rehabilitation Needs		
Recommendation	Relevant Pathway(s)	Recommended Tools and Resources

<p>3. Functional rehabilitation assessments of identified issues should be completed at every level of care.</p>	<ul style="list-style-type: none"> • Acute Care/ Inpatient Rehabilitation • Post-acute • Continuing Care • Primary Care/Community Rehabilitation 	<ul style="list-style-type: none"> • C19 YRS • PCFS • Appropriate Comprehensive Assessment tool (post-acute and continuing care)
<p>4. Rehabilitation self-management strategies and resources must be supported across the care continuum.</p>	<ul style="list-style-type: none"> • Acute Care/ Inpatient Rehabilitation • Post-acute/Continuing Care • Primary Care/Community Rehabilitation 	<ul style="list-style-type: none"> • Post COVID-19 Patient self-management resources (MyHealth.Alberta)
<p>5. Priority assessments are required for patients in ICU who (a) require extended mechanical ventilation, sedation and/or prolonged bedrest; (b) are over 65 years of age; or (c) with chronic co-morbidities.</p>	<ul style="list-style-type: none"> • Acute Care/ Inpatient Rehabilitation 	<ul style="list-style-type: none"> • C19 YRS • PCFS
<p>6. Screening results in direct rehabilitation assessments in acute care.</p>	<ul style="list-style-type: none"> • Acute Care/ Inpatient Rehabilitation 	<ul style="list-style-type: none"> • C19 YRS • PCFS • Saint Louis University Mental Status Exam • 6-minute Walk Test • Timed Up and Go Test • TOR-BSST © or Royal Brisbane swallowing screen • Hospital Anxiety and Depression Screen • AHS Cognitive Screening Resources

<p>7. Where patients have multiple diagnoses including COVID-19, the diagnosis with the most impairments should determine the inpatient rehabilitation trajectory.</p>	<ul style="list-style-type: none"> • Acute Care/ Inpatient Rehabilitation 	<ul style="list-style-type: none"> • C19 YRS • PCFS
<p>8. Patients living in facility-based continuing care should follow similar recommendations to those living in the community, but providers will customize based on patient needs and goals of care, as well as resources.</p>	<ul style="list-style-type: none"> • Post-acute • Continuing Care 	<ul style="list-style-type: none"> • Post COVID-19 patient self-management resources (MyHealth.Alberta)
<p>9. All patients should have access to educational resources on anticipated symptoms, exercises, and self-management.</p>	<ul style="list-style-type: none"> • Post-acute • Continuing Care • Primary Care/Community Rehabilitation 	<ul style="list-style-type: none"> • "How to Support Your Recovery and Rehabilitation After COVID-19" (MyHealth.Alberta) • AHS COVID-19 Safe Discharge Checklist • My Discharge Checklist
<p>10. Appropriate rehabilitation programming for patients will vary based on patient functioning and goals, as well as resource availability. Existing pathways will direct patients to community rehabilitation or home care based on eligibility and needs.</p>	<ul style="list-style-type: none"> • Post-acute • Continuing Care • Primary Care/Community Rehabilitation 	<ul style="list-style-type: none"> • Appropriate Comprehensive Assessment tool (post-acute and continuing care) • C19 YRS • PCFS • Post COVID-19 patient self-management resources (MyHealth.Alberta)
<p>11. Primary care providers are the lead care providers of, and can share resources with, patients who are directing their own recovery.</p>	<ul style="list-style-type: none"> • Primary Care/Community Rehabilitation 	<ul style="list-style-type: none"> • Post COVID-19 patient self-management resources (MyHealth.Alberta) • Provider Post COVID-19 resources are currently under development

Discharge & Transition Planning

Recommendation	Relevant Pathway(s)	Recommended Tools and Resources
<p>12. There is a process to track and support patients with rehabilitation needs Post COVID-19 that includes discharge documents, data monitoring, patient/family involvement, appropriate triage processes, education, evaluation strategies and communication strategies.</p>	<ul style="list-style-type: none"> • Post-acute • Continuing Care 	<ul style="list-style-type: none"> • Post COVID-19 patient self-management resources (MyHealth.Alberta) • Existing Discharge and Transition processes
<p>13. A central intake or transition and discharge coordinator should be embedded within existing services to identify rehabilitation needs in the community and support patients in wayfinding and transition.</p>	<ul style="list-style-type: none"> • Post-acute • Continuing Care • Primary Care/Community Rehabilitation 	<ul style="list-style-type: none"> • Transition Services, Discharge Planning, Continuing Care Access (central intake) and case management model meet this recommendation for post-acute and continuing care) • Upcoming implementation and pilot testing will determine appropriate pathways for central intake and transitions relevant to the specific resources and supports in each Zone
<p>14. Patient education resources and support packages should be compiled at transition to community.</p>	<ul style="list-style-type: none"> • Post-acute • Continuing Care 	<ul style="list-style-type: none"> • Post COVID-19 patient self-management resources (MyHealth.Alberta)

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Figure Captions

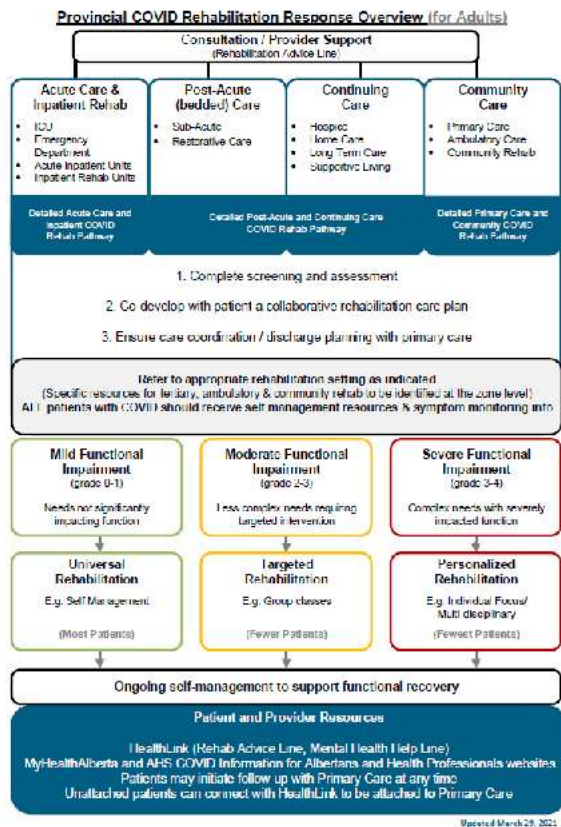


Figure 1. The Provincial Post COVID-19 Rehabilitation Response Overview. Reprinted with permission of Alberta Health Services (Calgary, AB, Canada) from <https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-post-covid-rehab-response-framework-summary.pdf>.⁴⁹

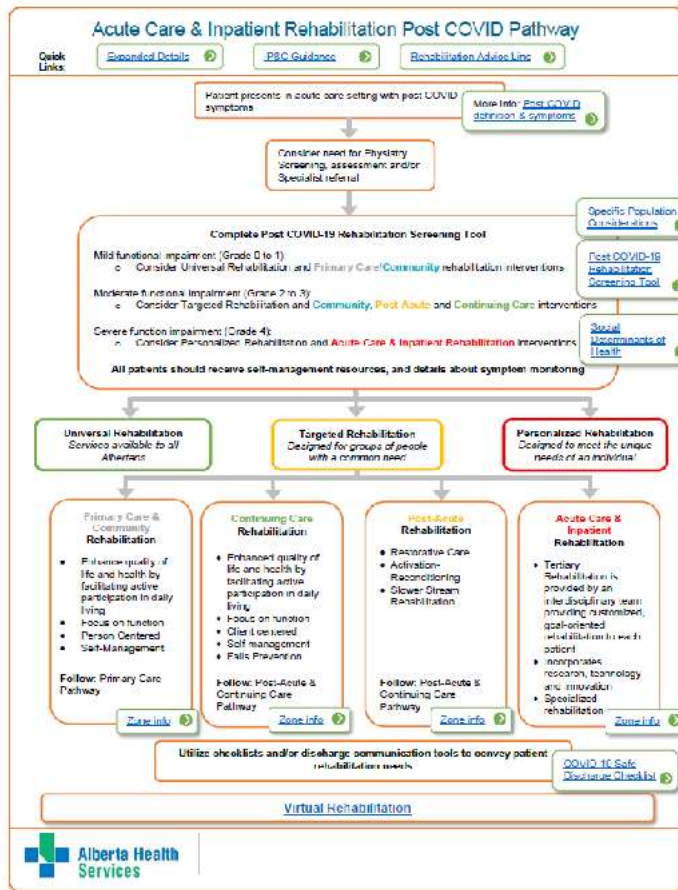


Figure 2. Care Pathway for Acute Care & Inpatient Rehabilitation. Reprinted with permission of Alberta Health Services (Calgary, AB, Canada) from <https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-post-covid-rehab-response-framework-summary.pdf>.⁴⁹

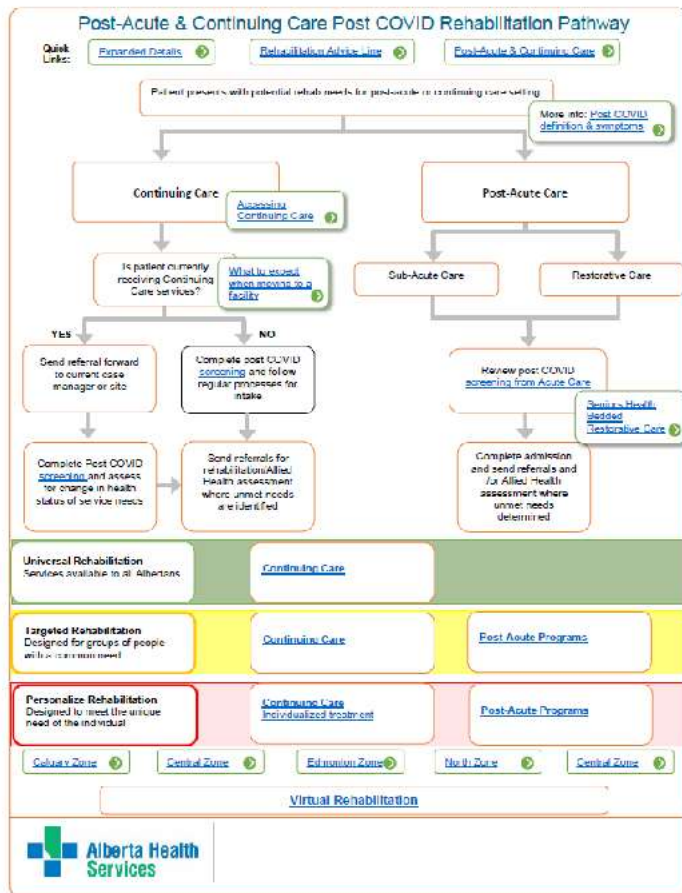


Figure 3. Care Pathway for Continuing Care. Reprinted with permission of Alberta Health Services (Calgary, AB, Canada) from <https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-post-covid-rehab-response-framework-summary.pdf>.⁴⁹

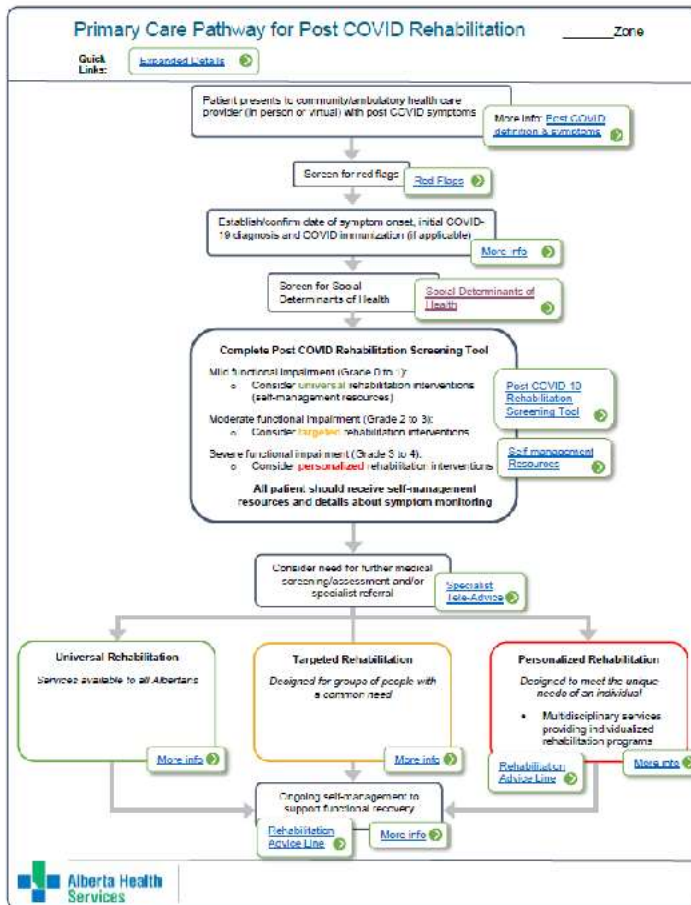


Figure 4. Care Pathway for Primary Care. Reprinted with permission of Alberta Health Services (Calgary, AB, Canada) from <https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-post-covid-rehab-response-framework-summary.pdf>.⁴⁹

Figure 4c