

Emergency Coordination Centre (ECC) Post-COVID Task Force

Understanding the Early Impact of Post-COVID Conditions in Alberta

A Final Report from the Alberta Health Services
Post-COVID Conditions Data & Reporting Working Group



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Executive Summary

As the COVID-19 pandemic continues, the impact of Post-COVID Conditions (PCC), or Long COVID, on the population of Alberta and its health system are significant and increasing. An estimated 20% of people who have experienced an acute COVID-19 infection will also experience PCC, which as of February 1, 2022 translated to **99,795 Albertans, 25% of whom are estimated will require ongoing health care and support**. As the final deliverable of the Data Capture and Reporting Working Group of the Post COVID Task Force, this report is intended only for AHS internal audiences **to inform planning and decision making**.

As Alberta and the world continues to learn about PCC and track its incidence and impact, it is important that Alberta does not currently have an integrated data source to track patients living with PCC, and two notable gaps in available provincial PCC data at this time are primary care and continuing care.

The first major section titled [Disease Characteristics](#) looks at early symptoms and functional scale measures of PCC through early results from a survey-based research study underway in Alberta. These self-reported results suggest PCC is a multi-organ disease and that the **total number of symptoms and number of organ symptoms affected do not vary greatly over time**.

The second major section titled [Patient Pathways to Information & Care](#) provides perspectives on current AHS services for individuals living with PCC: the Rehabilitation Advice Line (RAL), Alberta Health Living e-courses, MyHealth.Alberta.ca websites, and PCC Specialty Pulmonary Clinics. **Usage of the RAL and web services varies across zones, while the wait lists for the PCC Specialty Pulmonary Clinics (only located in Edmonton and Calgary) can be as long as 100 days**.

The third major section titled [Health System Impacts](#) provides a perspective on the early impact of COVID-19 on the healthcare workforce, and early results from an important study that looks at health system utilization by individuals living in Alberta who are living with PCC. Early Worker's Compensation Board - Alberta (WCBA) data shows **COVID-19-related claims by the AHS workforce were proportionally greater in the North, Central, and South Zones over time**. While still much is unknown about how individuals who live with PCC will utilize Alberta's healthcare system, early (raw and unadjusted) results from the study show **individuals who were COVID-positive and hospitalized generally had far greater post-COVID healthcare utilization** than non-COVID matched cases. The study also shows **non-hospitalized COVID-positive individuals were relatively similar in their post-COVID healthcare utilization to non-COVID matched cases**.

Along with presenting a current picture of PCC in Alberta, this report provides groundwork for important next steps. The authors would like to sincerely thank members of the AHS PCC Data & Reporting Working Group and other collaborators (listed on page 6) for the many contributions to this report, which stands as a foundation for the future development of a **provincial PCC dashboard** and other related next steps that will continue to further our understanding of the experiences and support the needs of the growing numbers of individuals in all parts of the province who are living with PCC.

The Issue

The impact of COVID-19 on Albertans and the healthcare system has been significant and continues to increase. In addition to treating acute infection and complications related to the novel coronavirus SARS-CoV-2, focus is also shifting to the growing number of individuals who continue to experience COVID-19 symptoms for months after the acute infection with the virus who have not fully “recovered”. This is commonly known as Post-COVID Conditions (PCC) or Long COVID, and people living with ongoing symptoms beyond acute COVID-19 infection are frequently known as “Long Haulers” [AHS Post COVID-19 Playbook Chapter 11, 2021].

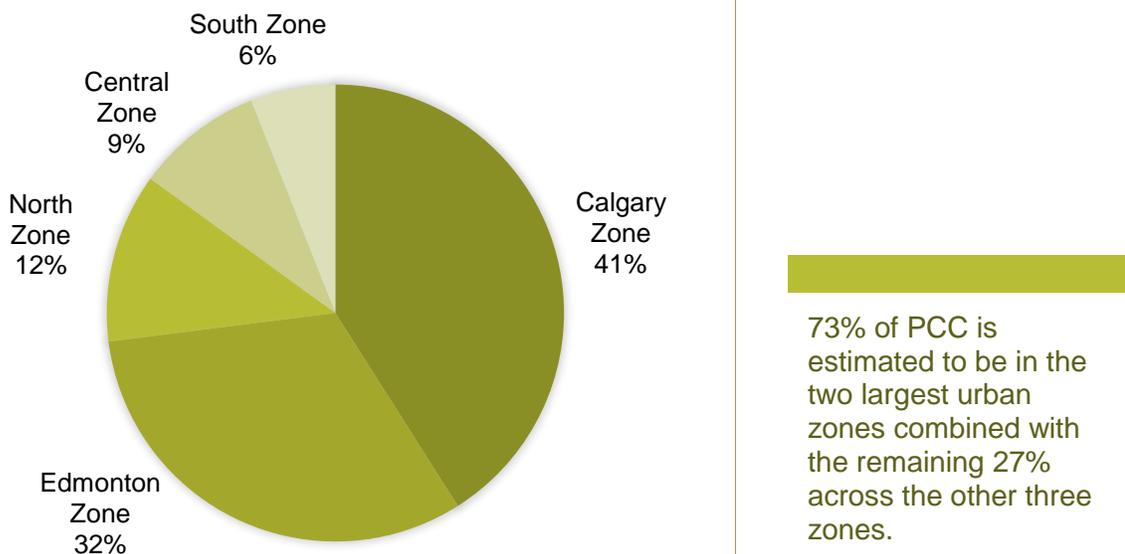
Prevalence of PCC

A recent British Medical Journal article estimates two million individuals in the UK will experience PCC, which can be extrapolated to more than 50 million people worldwide [Sivan et al., 2022]. The prevalence of PCC is typically reported between 10% and 35% of positive cases based on studies across the world using data from 2020-21. Currently, the World Health Organization (2022) suggests 20% of people who experience an acute COVID-19 infection will also experience PCC symptoms typically within three months (>12 weeks) from the onset of COVID-19. As shown in Table 1 and Figure 1, translating this 20% estimate to a local context indicates that **99,795 Albertans** (as of February 1, 2022) are currently living with or will develop PCC. Of this total, **about 25% (24,948 Albertans)** are expected to require multidisciplinary care that could include rehabilitation, medical, and psychosocial supports for **more than 12 weeks** after their COVID-19 diagnosis [AHS Post COVID-19 Playbook Chapter 11, 2021].

Table 1: Estimated Prevalence of PCC in Alberta by Zone

Zone	Estimated Prevalence (number of cases of PCC) as of February 1, 2022
North Zone	11,029
Edmonton Zone	32,062
Central Zone	9,879
Calgary Zone	40,391
South Zone	6,226
TOTAL:	99,587*

***Note:** This total differs from the estimate of 99,795 above because 208 individuals did not have a zone identified in the data.



[Source: AHS Post-COVID-19 Playbook]

Figure 1: Estimated % Prevalence of PCC in Alberta by Zone

Patient Demographics & Symptoms of PCC

PCC is experienced by people of all ages regardless of acute illness severity, hospitalization, or whether or not a COVID-19 test was ever obtained. Some commonly recognized risk factors that have statistically significant associations with PCC (based on

studies involving all types of COVID-19 patients) include: older age, multiple symptoms during acute infection, ICU admission, hospitalization, sex, and presence of co-morbidities [AHS SAG Rapid Review, 2021]. More than 100 distinct symptoms post-COVID have been reported in studies across the world in individuals who have tested positive for COVID-19. The most common reported post-COVID symptoms include fatigue, general pain or discomfort, sleep disturbances, shortness of breath, and anxiety or depression [AHS SAG Rapid Review, 2021].

AHS' Response

Alberta Health Services (AHS) has developed and implemented services to support individuals in Alberta who are living with PCC. Several research studies are also underway in Alberta and early results are included in this report. These studies, as well as other available clinical and administrative data sources, will inform healthcare decisions and guide the appropriate allocation of health resources to meet the needs of people living with PCC over time as the COVID-19 pandemic continues to evolve.

Our Approach

Team and Objective

In April 2021, the AHS Emergency Coordination Centre (ECC) Post-COVID Task Force formed the PCC Data & Reporting Working Group. This group met until January 2022 and consisted of AHS staff living with PCC; Analytics; Health Information Management; Nutrition Services; People Health Professions Strategy & Practice; Information Technology; Provincial Seniors Health & Continuing Care; Public Health Surveillance; and the Rehabilitation Advice Line. The group's mandate was to begin to understand the early impact of PCC on Alberta and its population, and to report findings to the AHS

Executive Leadership Team, Zone Operations, and senior medical and operational leaders across the province to aid in operational planning and decision making.

Data Sources, Timeline and Scope

The Working Group began by completing an informal environmental scan of administrative health data and reporting across Alberta’s provincial healthcare system, including AHS, Covenant Health, Provincial Seniors Health & Continuing Care, and Primary Care.

We encountered significant [Data & Reporting Limitations](#) , and there was high variability in the reporting timeframes across data sources. Generally, given the timing of this work, data sources included (at most) the first four waves of COVID-19 in Alberta (from March 2020 to the end of December 2021). The report is based entirely on observational data and does not model or extrapolate beyond this period. In evaluating PCC and its early impact in Alberta, the Working Group considered PCC on an individual, treatment, and system level (see Figure 2) and defined three key questions that focused on the impact on patients and families; opportunities to improve patient pathways to information and care; and impacts on clinical utilization and AHS’ workforce.

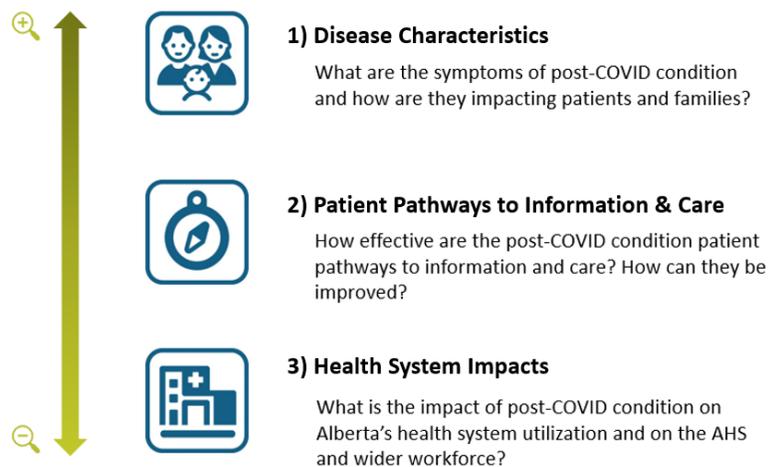


Figure 2: Report Scope & Questions

Provincial Data Snapshots (2020-21)

Early Working Group deliverables included four provincial data snapshots, which provide different perspectives on the impact of PCC in Alberta. Please note these files are hosted on the ECC Task Force SharePoint site, so the links only work for those with access permission. To request access to these files, please follow-up with this report's [contacts](#).



[Snapshot 1](#)

PCC Specialty
Pulmonary Clinics

Provides detailed clinical administrative information on the Edmonton and Calgary PCC Specialty Pulmonary Clinics. This includes patient demographics, referral source, and patient outcome measures provided by the Medicine SCN. Highlights from this data snapshot are included in the [Patient Pathways to Information & Care](#) section of this report.



[Snapshot 2](#)

PCC AHS / Covenant
Workforce

Provides Workers' Compensation Board - Alberta (WCBA) information on COVID-related claims. This includes claims data by zone and over time. Highlights from this data snapshot are included in the [Health System](#) section.



[Snapshot 3](#)

PCC Healthcare
Utilization

Includes detailed graphs with early research results from the "Long-term consequences of COVID-19: A population-based retrospective cohort study" completed by the Public Health Surveillance team. Highlights from this data snapshot are included in the [Health System](#) section.



[Snapshot 4](#)

PCC Rehabilitation
Advice Line

Provides detailed analysis of the AHS Rehabilitation Advice Line (RAL), including data on call volumes and patient reported functional scales. Highlights from this data snapshot are included in the [Patient Pathways to Information & Care](#) section.

Data & Reporting Limitations

At the time of writing, significant data deficits persist, making it challenging for the Working Group to provide a complete and integrated understanding of PCC in Alberta. Notable gaps and challenges are summarized below.

Lack of Patient Data Integration - At present, there is no provincial clinical database that spans and connects all functional areas of the healthcare system within and beyond Alberta Health Services (AHS). The continued rollout of Connect Care across the province will advance this integration. Throughout 2020 and 2021, the Canadian Institute for Health Information (CIHI) established standardized ICD-10-CA codes and descriptions for PCC [CIHI, 2021]. Connect Care and non-Connect Care sites have these codes available; however, their level of uptake and usage was extremely limited during the time periods covered in this report and their utilization over the full course of the pandemic has yet to be determined.

Inconsistent Data Definitions & Data Capture - Data definitions and capture across the province, the country, and the world have varied. COVID-19 and PCC are new conditions, and both are being studied and tracked extensively, albeit in non-standardized ways. At the time of writing, there are no clear widely recognized standards for PCC case definition or clinical criteria for diagnosing PCC, symptoms of PCC, or even timeframes that delineate when PCC begins after the initial COVID-19 infection.

Data Gaps - In Alberta, there are currently no provincially integrated electronic medical records in primary care. Additionally, there is no integrated patient record system available across continuing care locations. In both primary care and continuing care, PCC data collection is evolving and needs to be explored further beyond this report.

Ongoing & Evolving Pandemic - At the time of writing, Albertans have experienced five waves of the COVID-19 pandemic. Each wave has varied in terms of the dominant variant(s), infection rates, hospitalizations, duration, and patient demographics. The prevalence of PCC continues to increase and the cumulative impacts to individuals, AHS' workforce, and Alberta's health system continue to evolve. These variables coupled with the dynamic, rapidly changing information and clinical environment pose challenges for studying its impact, both retrospectively and in real-time.

Given these data and reporting limitations, this report is not able to provide a fully integrated and consistent picture of PCC disease characteristics, patient pathways, or health system utilization. However, it provides a preliminary analysis of the currently measurable impacts of PCC in Alberta on two scales: (i) the patient level and (ii) the health system level. Patient-level impacts are considered in the sections on [Disease Characteristics](#) and [Patient Pathways to Information and Care](#). Impacts on the AHS workforce and clinical services utilization are covered in the section on [Health System Impacts](#).

Information presented in the sections on Disease Characteristics and Health System Impacts rely heavily on early results from two major research studies in Alberta. The final sections of this report outline (i) recommended specifications for a [PCC Dashboard](#) to integrate data sources and visualize key metrics related to PCC and its impacts on Alberta's population and health system over time, and (ii) [Next Steps](#), including enablers that will support more fulsome and integrated data capture and reporting going forward to be able to rigorously evaluate the impact of PCC in Alberta over time.



Disease Characteristics

Objective: Identify and track symptoms and functional scale measures of PCC and how they are impacting individuals across the province and over time.

Data in this section is based entirely on a retrospective, case-control study called The Alberta Post-COVID Follow-up Study. This study is led by a multidisciplinary team at the University of Alberta and the Alberta SPOR SUPPORT Unit (AbSPORU)¹ with funding provided by Alberta Health. The study examines the association between testing positive for COVID-19 and the reporting of long-term physical and psychosocial health outcomes. It compares a cohort of Albertans with a laboratory-confirmed COVID-19 diagnosis to a randomly selected cohort of Albertans who tested negative and remained negative for COVID-19. Albertans who tested positive or negative for COVID-19 between March 2020 and November 2021 were mailed an invitation letter for participation in the survey study. Respondents could respond to the survey online or via a phone interview. Responses as of December 2021 corresponded to those who tested during the first three waves of the pandemic in Alberta.

Results of the study (survey responses) will be used to understand the type, duration, and severity of physical and psychological outcomes for those who have experienced a

¹ Study Principal Investigators - Colleen Norris (Scientific Director, Cardiovascular Health and Stroke SCN; Professor, University of Alberta) and Jeffrey Bakal (Program Director, Provincial Research Data Services). Other team members: Chester Ho (Senior Medical Director, Neurosciences, Rehabilitation and Vision SCN; Professor, University of Alberta), Elisavet Papathanassoglou (Scientific Director, Neurosciences, Rehabilitation and Vision SCN; Professor, University of Alberta), and Paul Wright (Executive Director, Neurosciences, Rehabilitation and Vision SCN). The team also includes Xueyi Chen (Post-doctoral trainee), Barb Waldie (Project Manager), Tara Whitten (Senior Analyst), and Shahin Hassam (Research Associate).

COVID-19 infection in Alberta. The prevalence of physical and psychosocial symptoms following acute COVID-19 will be calculated. Analyses will include comparisons of the demographics and/or differences between survey responders and non-responders. A series of statistical analyses will also be completed.

Survey Results – Hospitalizations

Table 2 shows preliminary results from survey responses summarizing the number and proportion of respondents who tested positive for COVID-19 and the number and proportion who tested negative. Of the positive cases, Table 2 shows the number and proportion of respondents who self-reported that they were hospitalized due to their acute COVID-19 infection and those who reported that they were non-hospitalized. Of the **2,478 total survey respondents from Alberta, 384 (15.5%) tested negative, 1,966 (79.3%) tested positive and were not hospitalized, and 119 (4.8%) tested positive and were hospitalized.**

Table 2: Test Status of Preliminary Survey Respondents (Oct 14, 2021, to Jan 6, 2022)

COVID-19 Status	Sample Size (n)	Percentage (%)
COVID-19 test negative	384	15.5
COVID-19 test positive (Total)	2,094	84.5
Non-hospitalized test positive	1,966	79.34
Hospitalized test positive	119	4.80
Null	9	0.36

Survey Results – Number & Symptom Types

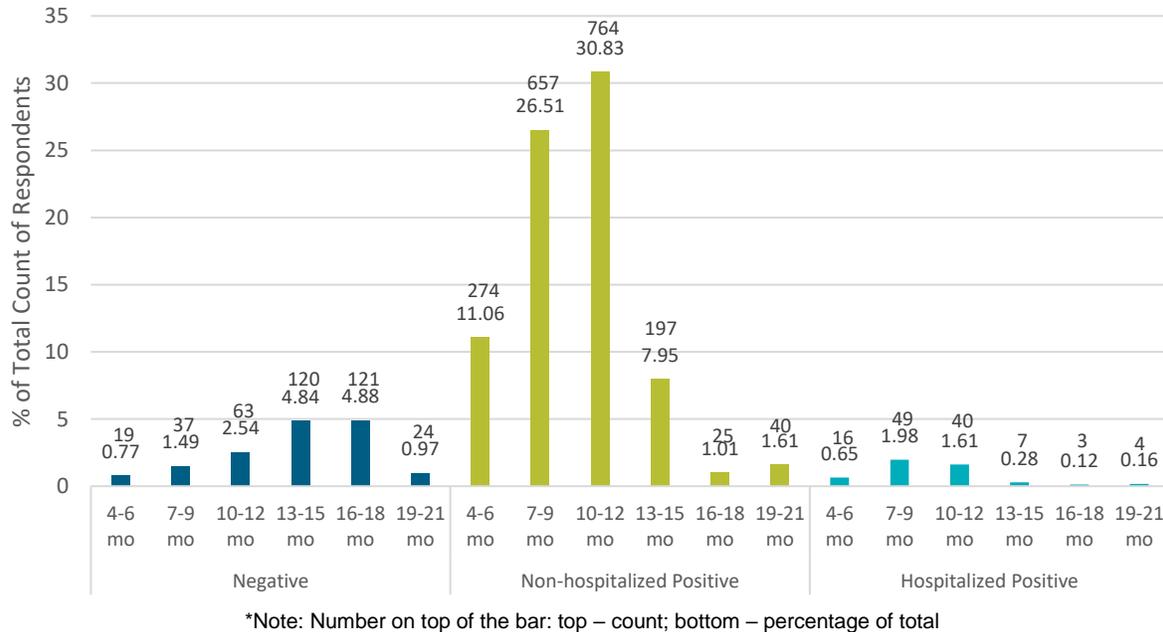
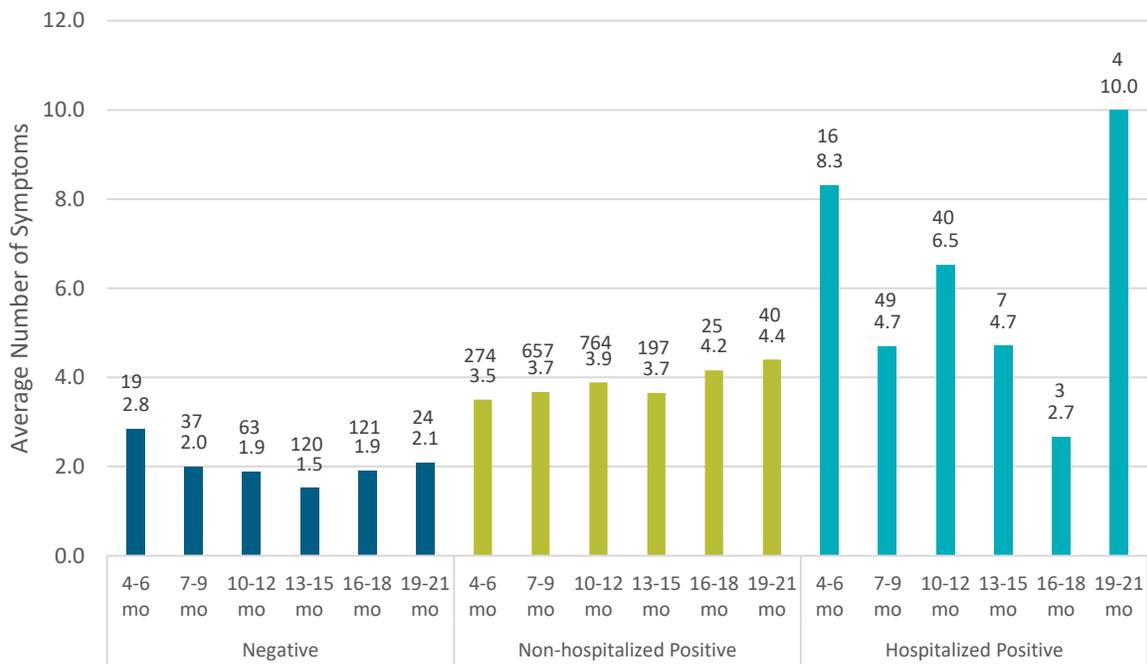


Figure 3: Respondents by Time from COVID Test to Survey Completion

Figure 3 shows the time elapsed between survey completion and the respondent's COVID-19 test. Most respondents completed the survey four to 21 months after their COVID test. Many respondents who tested negative completed the survey between 13 and 18 months after their test, while more individuals who tested positive responded to the survey seven to 12 months after their test.

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*Note: Number on top of the bar: Top – Number of respondents in the group; Bottom – Average of symptom count.

Figure 4: Average Number of Symptoms in Survey Respondents

The survey also asks respondents about symptoms they had experienced within the seven days immediately prior to the day they completed the survey. As Figure 4 shows, on average, those who tested positive and were hospitalized (turquoise bars) had more symptoms persist than those who had tested positive but were not hospitalized (green bars) or those who had tested negative (navy bars).

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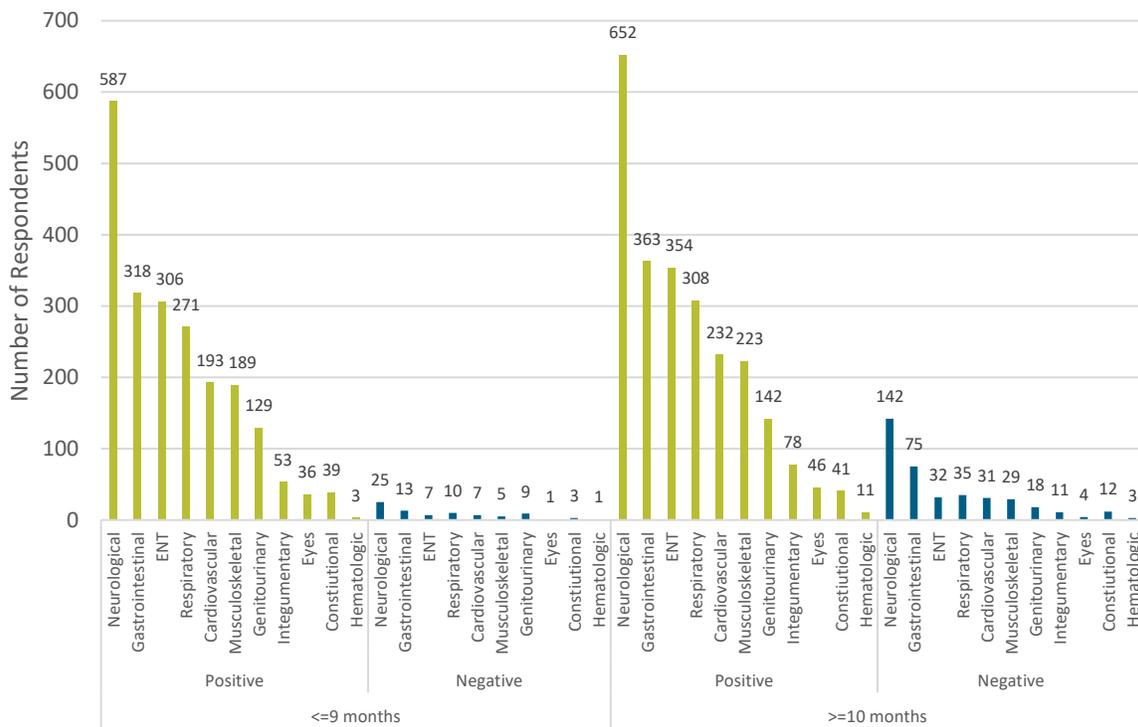
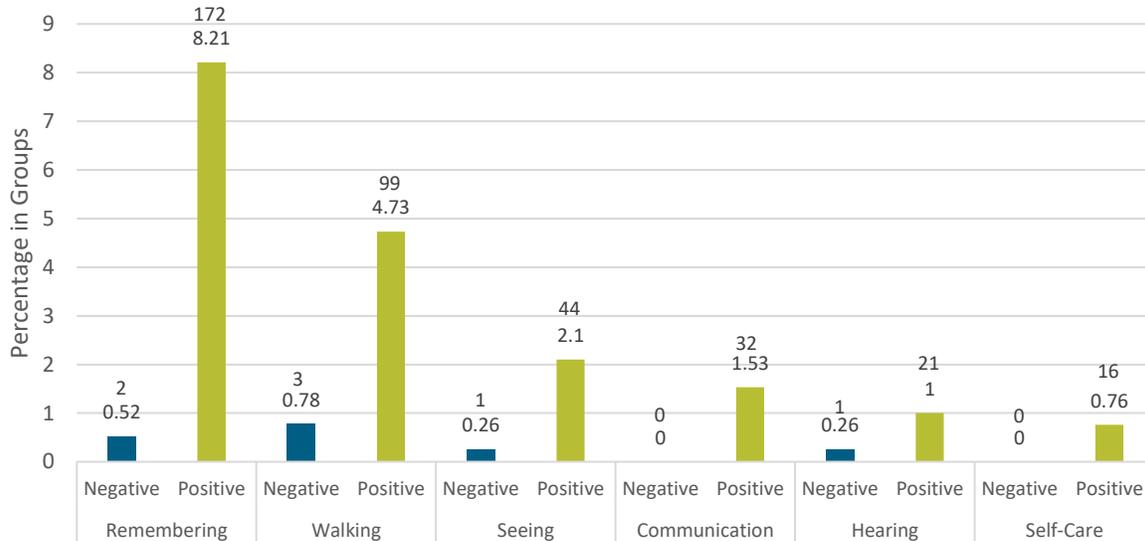


Figure 5: Numbers of Survey Respondents with ≥ 1 Symptoms by Body System, Categorized by Body System and Time since COVID-19 Test

As Figure 5 shows, COVID-positive respondents (green bars) experienced symptoms involving many body systems, many persisting more than ten months beyond the original infection. For those in the positive group reporting more than one symptom, the top five body systems affected as part of their PCC were the neurological; gastrointestinal; ear, nose and throat (ENT); respiratory; and cardiovascular systems.

Survey Results – Functional Task/Level of Disability



*Note: Number on top of the bar: Top – Count; Bottom - Percentage within its own group (positive or negative)

Figure 6: Survey Respondents Reporting New/Worsening Disability, categorized by original COVID-19 test result

The survey also asks respondents about difficulties they may have doing certain activities because of a health problem. This includes any difficulties seeing, hearing, walking, remembering or concentrating, communicating, and caring for one’s self. Respondents are asked to rate their ability to complete these tasks before their COVID test and the day they complete the survey.

Higher proportions of those who tested positive had a new or worsening disability than those who tested negative (Figure 6). New or worsening are understood as those who reported new or worsening disability at the time of survey completion compared with the pre-COVID-test period. These individuals are currently suffering a lot of difficulty or cannot do the activity at all. For example, those with a ‘no’, ‘some’, or ‘a lot’ of difficulty pre-COVID test and now cannot do the activity are counted as ‘new or worsening’ in Figure 6. Many survey respondents reported ‘new or worsening’ difficulty in remembering or concentrating.



Disease Characteristics – Key Messages

- Self-reported hospitalization rate is 5.68% in the COVID-positive group.
- The COVID-positive group reported a higher number of PCC symptoms, especially in those who were admitted to hospital.
- The number of self-reported symptoms reported by survey respondents did not vary greatly by the length of time since their positive COVID test.
- Reported post-COVID symptoms affect multiple organ systems, including neurological, cardiovascular, respiratory, and others, which suggests that Long COVID/PCC may be a multi-organ disease.
- The number of organ systems affected did not vary greatly by the length of time from COVID-19 test.
- The COVID-positive group has a higher percentage of respondents who reported new or worsening disability compared to their condition before their COVID-positive test.



Patient Pathways to Information & Care

Objective: Provide perspectives on the patient pathways to information and care experienced by, and available to, individuals living with PCC across Alberta.

There are currently challenges with defining and measuring patient pathways for people living with PCC in Alberta, in part because planning and services for this new condition vary across the province. Separate from our Data & Reporting Working Group, there is another Post-COVID Task Force Working Group dedicated to this topic, and their work includes building an inventory of all PCC services currently available in each zone. At this time, assessing the effectiveness of patient pathways is limited to measuring awareness of, and access to, pathway-related information and selected patient care services. This report considers data from the AHS Rehabilitation Advice Line (RAL); Alberta Health Living Program (AHLP) webinars; the MyHealth.Alberta web site; and PCC Pulmonary Specialty Clinics.²

² RAL key contact: Kira Ellis (Senior Consultant).

Alberta Healthy Living Program key contact: Teresa Krahn (Program Manager).

PCC web resources key contacts: Korey Cherneski (Senior Communications Advisor), Nicole McKenzie (Manager, Neurosciences, Rehabilitation and Vision SCN).

PCC Pulmonary Clinics key contacts: Desi Fuhr (Project Manager), Lesley Soril (Assistant Scientific Director, Medicine SCN).

Rehabilitation Advice Line (RAL)

The RAL launched in 2020 and uses telehealth service delivery to respond to callers' PCC rehabilitation needs. All COVID-positive patients automatically receive a link to the RAL and AHS' online resources via an automated text message alert they receive from Public Health in response to a positive polymerase chain reaction (PCR) test.

The RAL team is also piloting a Call-Back Service to support patients discharged from hospital after the acute COVID-19 phase. These patients are screened for rehabilitation needs using the Post-COVID Functional Status (PCFS) Scale & Symptom Checklist, Post-Viral Fatigue Scale, and EuroQol-5 Dimension (EQ5D). The EQ5D is an instrument used to describe and value health and includes the dimensions of mobility; self-care; usual activities; pain & discomfort; and anxiety & depression [EuroQol Group, 2021]. The RAL also provides a letter to Primary Care physicians with recommendations. The pilot for this Discharge Callout Process started in the Calgary Zone on June 23, 2021. The North Zone was added on July 19, 2021. The Central, Edmonton, and South Zones were added on July 26, 2021.

On September 24, 2021, a process change occurred in which AHS administrative staff were trained and began making the initial call to eligible individuals to conduct the PCFS. Patients were referred to call the RAL and speak to a rehabilitation specialist/clinician if deemed appropriate by a PCFS score of grade 3 or 4 indicating moderate to severe functional limitations. Individuals who call the RAL or have a follow-up call speak with a rehabilitation specialist/clinician who conducts the PCFS (if not done previously) and EQ5D surveys and determines if the individual requires further support.

Figures 7 to 10 highlight currently available RAL data, including call volumes and functional scale scores for COVID-positive individuals. For more detail, see [Snapshot 4](#). Figure 7 shows the RAL call-back assignment volume for the administrative staff and total PCC call volume from September 24 to November 25, 2021. Figure 8 shows the RAL call volume by zone for the same period.

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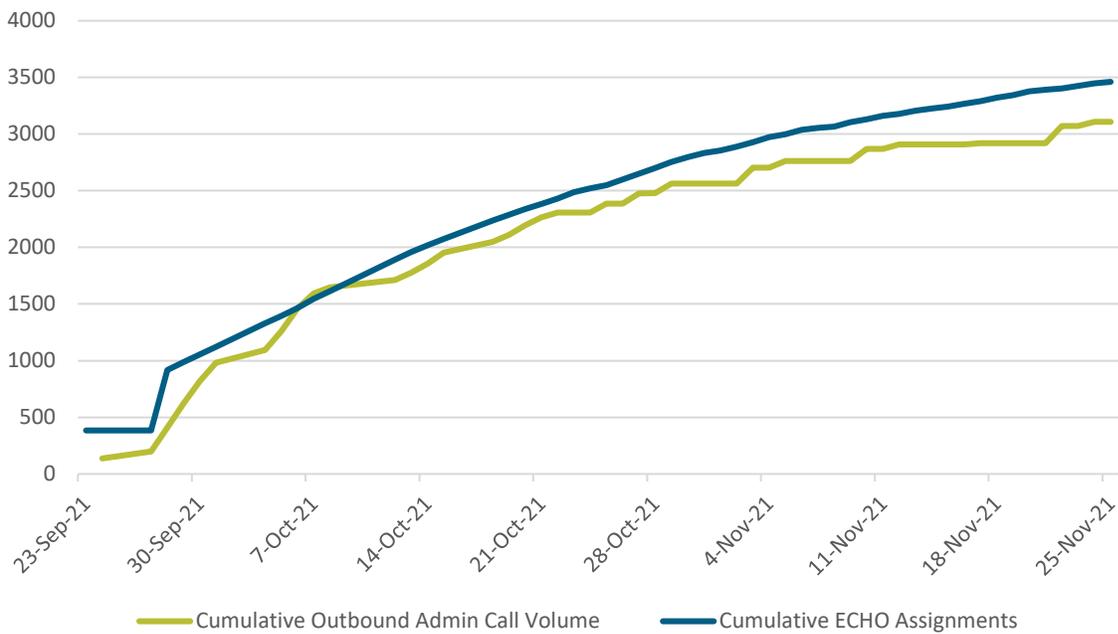


Figure 7: RAL Cumulative Call Assignment & Outbound Call Volume

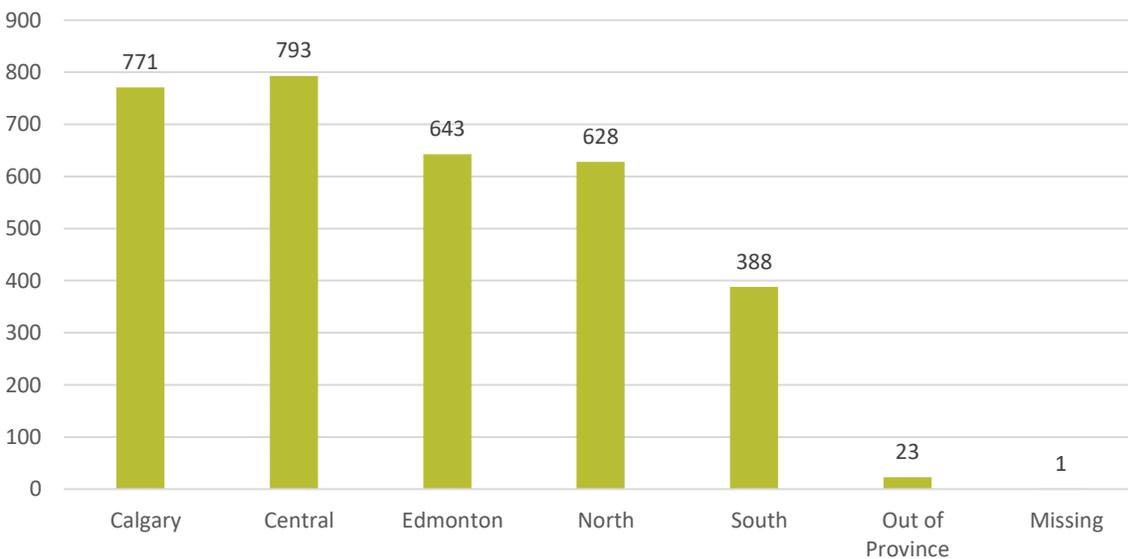


Figure 8: Number of RAL Calls by Zone

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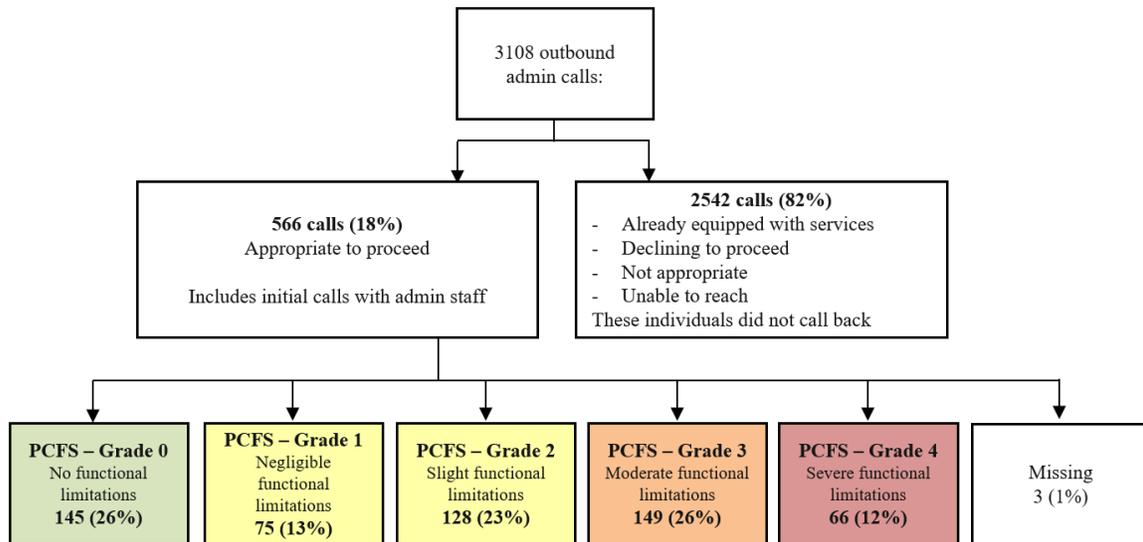


Figure 9: RAL Calls & Post-COVID Functional Scale Scores

Over the two-month reporting period, there were **3,108 outbound calls** made by administrative staff and **133 calls** made with RAL clinicians. Of the calls made to people by administrative staff, **566 (18%)** progressed to completion of the PCFS during the call. Results show that **215 people (38%) had moderate to severe functional limitations** (Figure 9). Figure 10 follows the 133 RAL calls with rehabilitation specialists/clinicians who completed PCFS with eligible individuals and results of those who proceeded to complete the EQ5D. Some respondents reporting moderate to severe functional limitations doing their normal daily activities.

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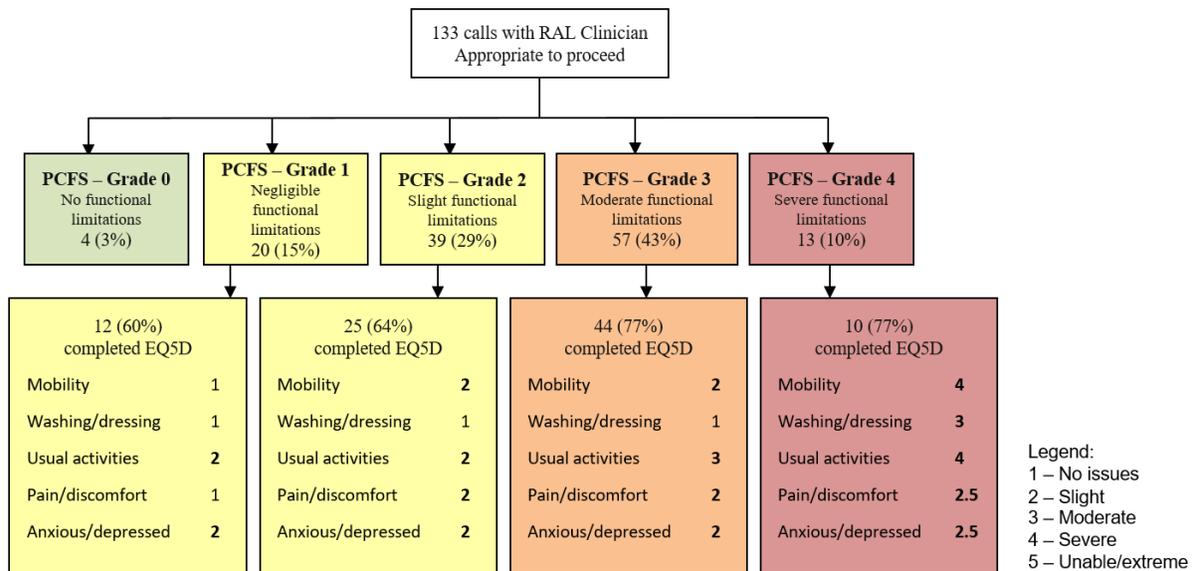


Figure 10: RAL Calls PCFS Scores +/- EQ5D Completed

Rehabilitation Advice Line Utilization (Sept 24 to Nov 25, 2021)

There was a broad distribution of calls among AHS zones. The greatest number of calls, by region, were to patients in the Central Zone and the least number of calls were to patients in the South Zone (see Figure 8).

Of the administrative calls where PCFS scores were obtained, **38% of PCC calls identified as having moderate to severe functional limitations (PCFS Grade 3 to 4)** (see Figure 9). The RAL data also showed that individuals with a higher PCFS score generally reported **poorer quality of life, including more mobility and self-care (washing/dressing) issues, increased pain/discomfort, and higher rates of anxiety and depression**, as measured by the EQ-5D (see Figure 10). This data indicates that many individuals with PCC require targeted education and self-management advice and continued follow-up and access to personalized health services, particularly Community Rehabilitation Services. For further details, see [Snapshot 4](#).

Alberta Health Living Program

The [Alberta Healthy Living Program](#) (AHLP) offers free online courses to patients and families with the goal of improving health and quality of life for those living with a chronic condition. The program provides a suite of [webinars](#) specific to PCC called “[Helping You Feel Better after COVID-19](#),” which at this time, includes topics such as: eating, breathing, sleeping, daily living, pain, activity, and stress. Each course is offered about once a month and started in July 2021.

AHLP Webinar Participation (July to Nov 2021)

Figures 11 and 12 show registration attendance by course and by zone.

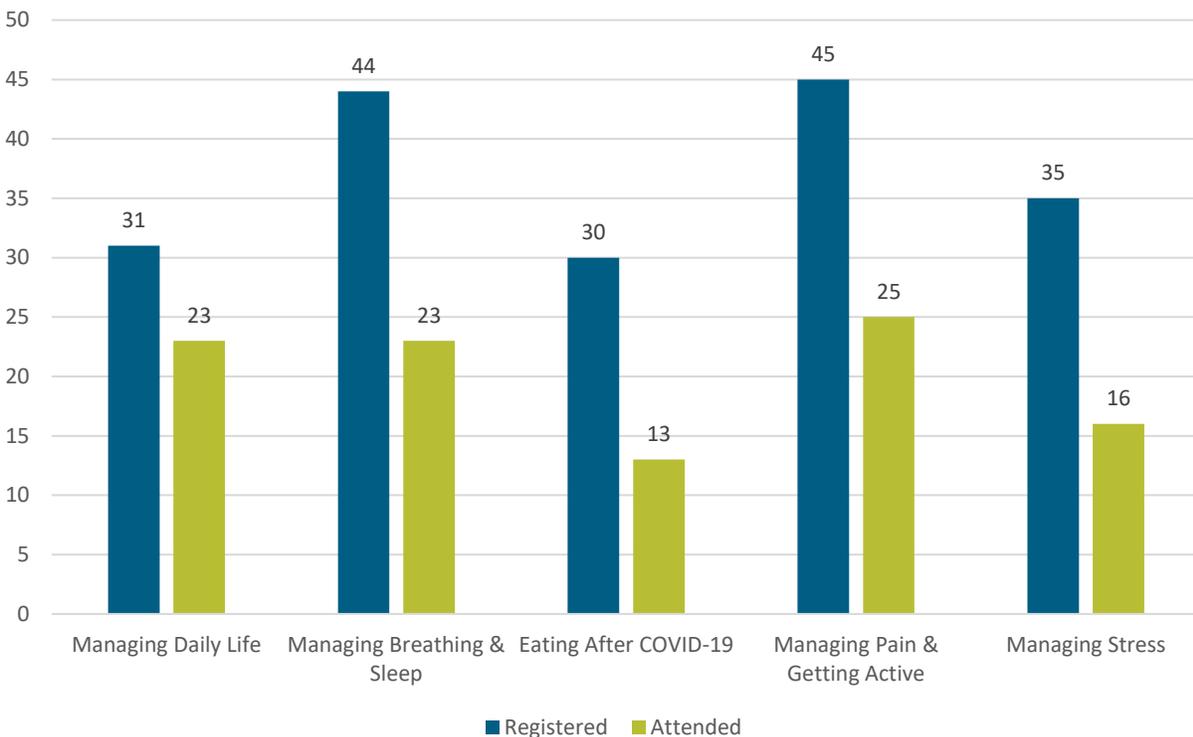


Figure 11: Healthy Living e-Course Registration & Attendance by Course

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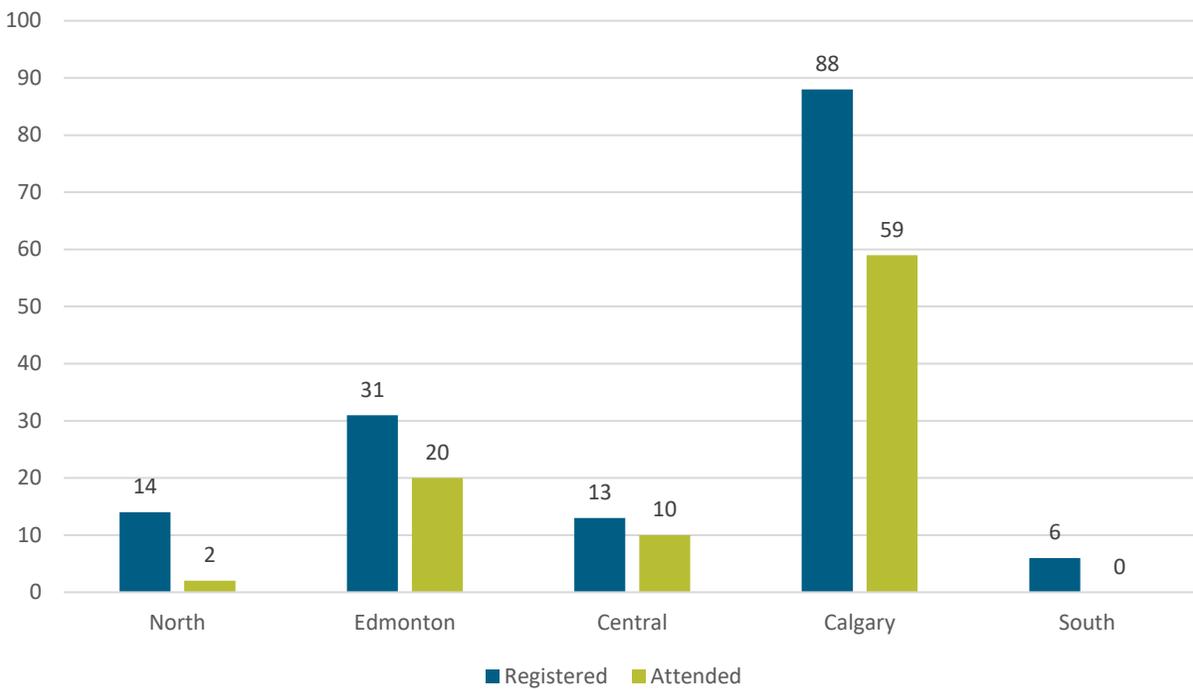


Figure 12: Healthy Living e-Course Registration & Attendance by Zone

PCC e-courses with the highest registrations were “Managing Pain & Getting Active” and “Managing Breathing & Sleep.” **Those with highest attendance were “Managing Pain & Getting Active”, “Managing Breathing & Sleep”, and “Managing Daily Life.”** This indicates these are issues important to individuals with PCC. **The Calgary Zone had the highest number of course registrations and attendance, whereas uptake was much lower in the North and South Zones.** The higher interest from patients in Calgary Zone may be partly due to promotion of these classes by Alberta Healthy Living Program Calgary Zone. Course registration and attendance were highest in July to August 2021 and have declined slightly over time. As with all e-courses, what appears to be a single individual attending might have multiple individuals viewing and participating.

MyHealth.Alberta.ca Website

Post-COVID content was created and added to the MyHealth.Alberta.ca website in late March 2021. The “After COVID-19: Information and resources to help you recover” content provides (i) resources for people recovering from COVID-19 who are having ongoing health concerns, (ii) information on self-managing symptoms after COVID-19, and (iii) links to the Rehabilitation Advice Line. Website analytics were measured starting in May 2021 to determine website usage and engagement. [Table 3](#) shows the number of unique sessions on the site and pageviews for web pages within the [After COVID-19: Information and resources to help you recover \(alberta.ca\)](#) section of MyHealth.Alberta.ca. **Total sessions and pageviews increased nine-fold in the winter (8-11 months following site launch) compared to the first quarter (spring/summer).**

Table 3: MyHealth.Alberta.ca Website Measures (After COVID-19 Pages)

Website Measure	May 1 to Jul 31, 2021 (3 months)	Aug 2 to Nov 7, 2021 (3 months)	Nov 8, 2021 to Feb 13, 2022 (3 months)
Sessions	13,776	48,986	128,184
Pageviews	17,668	66,384	151,449
Average pageview length (mins)	01:10	1:08	1:18

Definitions:

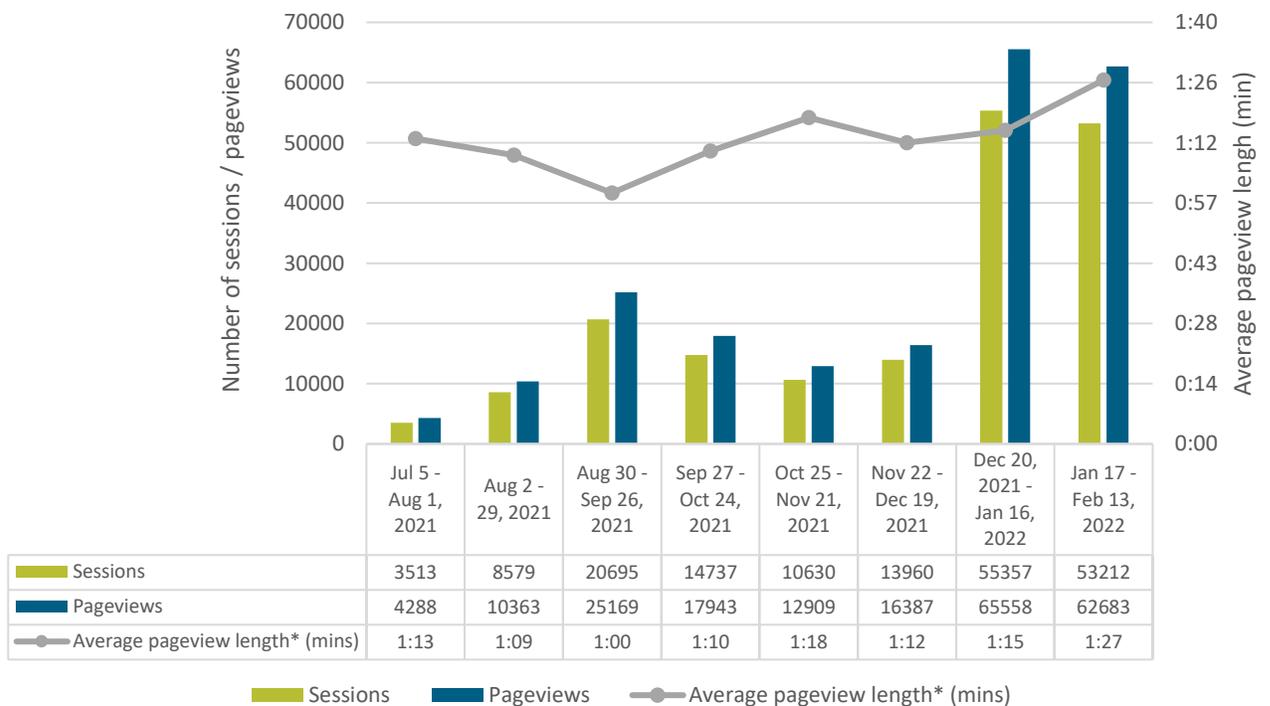
Sessions: A period of time in which a user is actively engaged on MyHealth.Alberta (MHA). A session ends after the user leaves MHA or is inactive for 30 minutes. This refers to the number of sessions where the user viewed at least one page in the after-COVID section of MHA.

Pageviews: The total number of times a page in this section was viewed.

Average pageview length: The average time spent viewing a page in this section.

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Figure 13 further breaks down the data into four-week intervals. Since launching the Post-COVID content, there has been a large increase in website sessions and pageviews, especially from late-December 2021 to mid-February 2022, corresponding to the start of the 5th wave in Alberta. The average time individuals spend on the website also increased at that time to 1 minute and 27 seconds. Additional information indicate that in the first two weeks of February 2022, the specific webpages most visited were those providing information for symptoms of coughing, joint and muscle pain, and loss of taste and smell.



*Average pageview length shown is the average time in the later 2 weeks of each of the listed time frames

Figure 13: MyHealth.Alberta.ca Website Measures Every 4 Weeks

PCC Specialty Pulmonary Clinics

Alberta had initially established two PCC Specialty Pulmonary Clinics: the Kaye Edmonton Clinic and the Calgary Peter Lougheed Centre Outpatient Clinic. Clinical administrative data is currently available for the Kaye Edmonton Clinic from June 2020 to September 2021. The Edmonton clinic serves patients from the Edmonton, Central and North Zones. The Calgary clinic was established more recently and data is available from November 2020 to May 2021. Figure 14 below currently only includes utilization and wait times data for the Edmonton clinic. Data analysis was facilitated by Desi Fuhr (Project Manager) and Lesley Soril (Assistant Scientific Director, Medicine SCN). For additional detail on patient demographics and outcome measures, including some early data from the Calgary clinic, see [Snapshot 1](#).

PCC Pulmonary Clinics – Utilization & Wait Times (2020-2021)

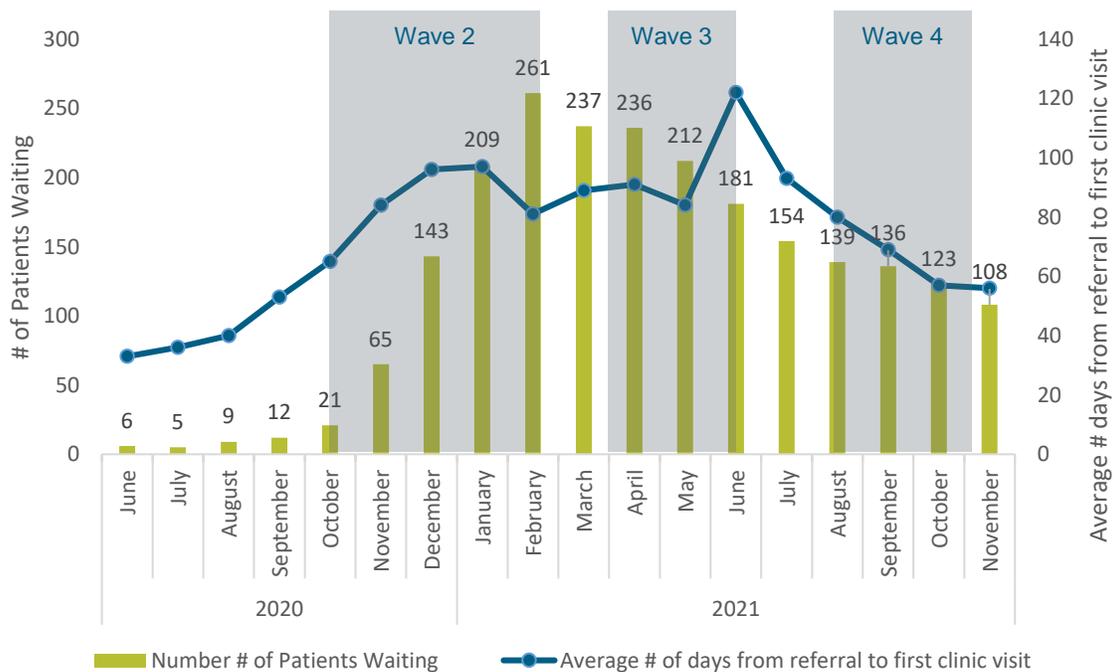


Figure 14: Edmonton Pulmonary Clinic Referral Wait Times & Magnitude

From June to October 2020, there was a slight increase in the number of patients on the waitlist for the Kaye Edmonton Post-COVID Pulmonary Clinic (see Figure 14). **The waitlist greatly increased from November 2020 to February 2021. Since then, there has been a gradual decrease** in the number of patients on the waitlist. For those on the waitlist, **the average number of days from referral to first clinic visit increased to almost 100 days** between June 2020 and January 2021 (**a 200% increase**). The average wait time then declined slightly before peaking again in June 2021 (122 days). It has since decreased (59 days in November 2021), which is roughly equivalent to November 2020.



Patient Pathways to Info & Care – Key Messages

- There was a broad distribution of RAL calls among zones. The greatest number of calls, by region, were to patients in the Central Zone and the fewest calls were to patients in the South Zone. Of the calls with PCFS outcomes, 38% of individuals had moderate to severe functional limitations.
- Alberta Healthy Living Program e-Courses: Attendance was highest in the Calgary Zone (65%). Nobody from South Zone has attended an e-course. Topics of greatest interest were “Managing Pain & Getting Active”, “Managing Breathing & Sleep”, and “Managing Daily Life.”
- MyHealth.Alberta.ca website views for post-COVID content increased through August-September 2021 and seem to correlate with the timing of waves four and five of COVID-19 in Alberta.
- PCC Specialty Pulmonary Clinics: Wait lists increased significantly from mid-2020 to early 2021 with some patients waiting 100 days between referral and first clinic visit. The number of patients on the wait list and wait times have been decreasing since early- to mid-2021, respectively.
- A patient pathway to assist people living with PCC to navigate supports and services available in each Zone can be found at Provincial Adult Long COVID Pathway (albertahealthservices.ca).



Health System Impacts

Objective: Provide perspectives on the impact of COVID on the healthcare workforce, and perspectives on health system utilization by individuals living in Alberta who are living with PCC.

This section considers impacts of PCC on Alberta's health system using two distinct data sets and perspectives:

1. It considers impacts to Alberta's health workforce using COVID-related claims made to the Workers' Compensation Board of Alberta (WCBA) by AHS and Covenant Health employees.
2. It considers health system utilization by individuals living with PCC and is based on a research project underway in Alberta called "Long-term Consequences of COVID-19: A population-based Retrospective Cohort Study." This study looks at health system utilization in terms of primary care clinic visits, ED and UCC visits, and hospital admissions and stays. At this time, more fulsome and integrated PCC primary care or continuing care utilization data are not available in Alberta. **IMPORTANT: Please note that the data and analysis provided from this study is raw and unadjusted. This report is intended for internal AHS use only as results will also be submitted for publication.**

WCBA Claims – AHS/Covenant Workforce (2020-21)

Data from the WCBA show the impact of PCC on the Alberta Health Services and Covenant Health workforces. This section provides highlights based on data currently available in Alberta. For more detail, see [Snapshot 2](#). COVID-related WCBA claims for AHS and Covenant Health and were identified using “COVID Nature of Injury” or a COVID ICD-9 code. Data is current to July 23, 2021. In some of the WCBA data, only AHS data is included and Covenant Health data is excluded. This is the case with Figure 15 below. In 2020, 90% of claims were from the health workforce in Alberta’s two urban zones - Edmonton and Calgary (Figure 15). **When comparing calendar year 2020 data to available 2021 data (up to July), the North, Central, and South Zones accounted for a greater proportion of COVID-related claims (26% of the provincial total in 2020, compared to 10% in 2021).** This shift reflects increased transmission of COVID-19 in all parts of Alberta through waves two and three and the increasing impact on rural sites and zones over time.

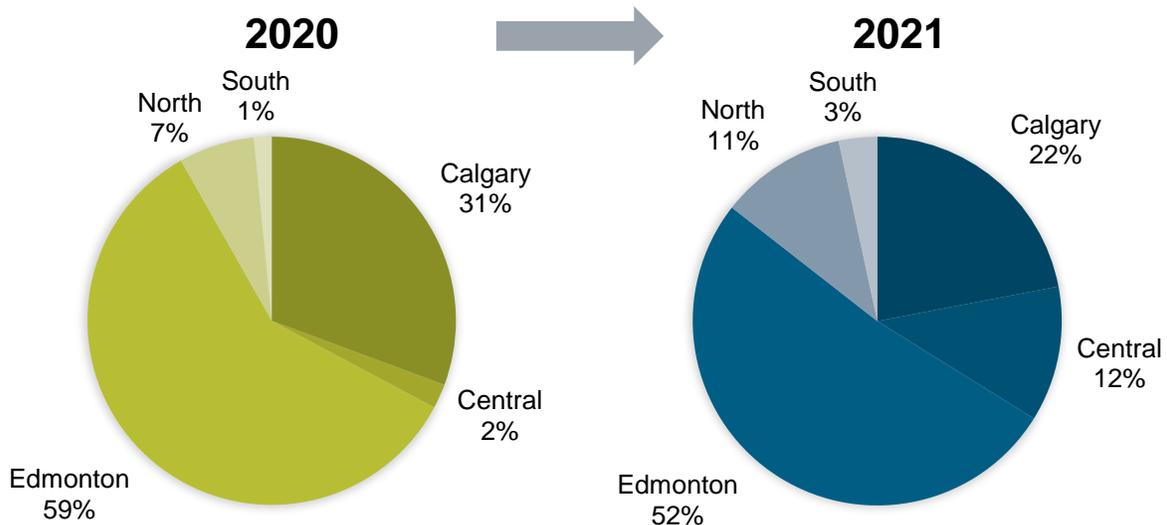


Figure 15: Percentage of AHS COVID-19 Related Claims by Zone

Health System Utilization by Zone (2020-21)

Data presented herein on health system utilization by people who live with PCC is based on the “Long-term Consequences of COVID-19: A population-based Retrospective Cohort Study.”³ As indicated, **the data and analysis is raw and unadjusted, and results should be interpreted with care.** The study followed a matched cohort of COVID-19 cases and non-cases (COVID-test negative), identified from March 5 to December 31, 2020, and compared the use of healthcare services between the groups from the time they were included in the study until April 30, 2021, subsequent re-infection with COVID-19, or death, whichever was earlier. It tracked utilization of various healthcare services including physician visits, emergency department/urgent care centre visits, and hospital admissions.

Early data shows that study participants who had been **hospitalized COVID patients, after their recovery from acute illnesses, generally had far greater healthcare utilization than non-COVID matched patients. Also, non-hospitalized COVID patients were relatively similar to matched non-COVID patients** (see Table 4 and Figure 16). As seen in Table 4 for cohort 1, for example, the percentages of unique persons with one or more emergency department or urgent care visits were from **3.2 times (first 30 days) to 1.6 times (last observation period) higher** for the hospitalized COVID group than for the non-COVID group over time. This pattern was seen across zones as well, as evidenced in Figure 17.

³ Principal Investigator - Khokan C. Sikdar (Team Lead). Other team members: Andrew Macmillan (Analyst), Dr. Gavin Y. Oudit (Physician), Hussain Usman (Executive Director), Jason L. Cabaj (Medical Officer of Health), Judy MacDonald (Physician), Thomas Lo (Senior Analyst), and Vineet Saini (Scientist Lead).

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Table 4: Use of Healthcare Services by Cohort and Time after Initial Infection Recovery

	Cohort Size	Time After Initial Infection Recovery	Any Contact	Physician (GP/SP)	ED/UCC Visit	Inpatient	Mean # of Events per Case*			
							Any	Visits (GP/SP)	ED/UCC Visit	Admissions (hosp.)
			% Cases with 1+ Event (1,0)				Mean # of Events per Case*			
Cohort 1										
Hospital COVID Positive* Group	3,396	30 days	86.5	86.4	15.6	5.2	4.5	4.2	0.3	0.1
	3,387	60 days	74.8	74.7	11.5	4.9	3.3	3.0	0.2	0.1
	3,311	90 days	68.6	68.5	10.3	4.0	2.8	2.5	0.2	0.0
	3,163	180 days	74.6	74.5	14.4	5.4	4.1	3.7	0.3	0.1
	738	>180 days	73.4	73.3	16.1	6.5	6.1	5.7	0.4	0.1
Hospital COVID-negative Matched Group**	3,396	30 days	48.4	48.4	4.9	2.6	1.7	1.6	0.1	0.0
	3,339	60 days	48.3	47.5	4.5	1.7	1.4	1.3	0.1	0.0
	3,275	90 days	47.5	46.9	3.8	1.4	1.4	1.3	0.1	0.0
	3,135	180 days	56.0	55.4	6.3	1.5	2.2	2.1	0.1	0.0
	731	>180 days	64.8	64.2	10.0	3.5	4.3	4.1	0.2	0.0
Cohort 2										
COVID Non-Hospital Group	95,389	30 days	35.9	35.9	2.9	0.5	0.8	0.8	0.0	0.0
	95,369	60 days	35.2	35.1	2.7	0.5	0.8	0.7	0.0	0.0
	95,326	90 days	35.0	34.9	2.8	0.5	0.8	0.7	0.0	0.0
	95,206	180 days	38.5	38.4	3.7	0.6	1.1	1.0	0.1	0.0
	16,512	>180 days	49.6	49.5	6.4	1.2	2.2	2.1	0.1	0.0
COVID-negative Non-Hospital Matched Group**	95,389	30 days	33.5	33.3	2.9	0.7	0.8	0.7	0.0	0.0
	95,099	60 days	33.3	33.2	2.8	0.6	0.7	0.7	0.0	0.0
	94,990	90 days	33.0	32.9	2.8	0.6	0.7	0.7	0.0	0.0
	94,682	180 days	37.2	37.1	4.0	0.8	1.1	1.0	0.1	0.0
	16,354	>180 days	53.3	53.1	8.6	1.7	2.6	2.5	0.1	0.0

* Hospital COVID Positive will include # of inpatient days (mean, median, IQR).

** Non-COVID groups are matched by age, sex, zone, and test date. Cohort 1 n=3,396. Cohort 2 n=95,389.

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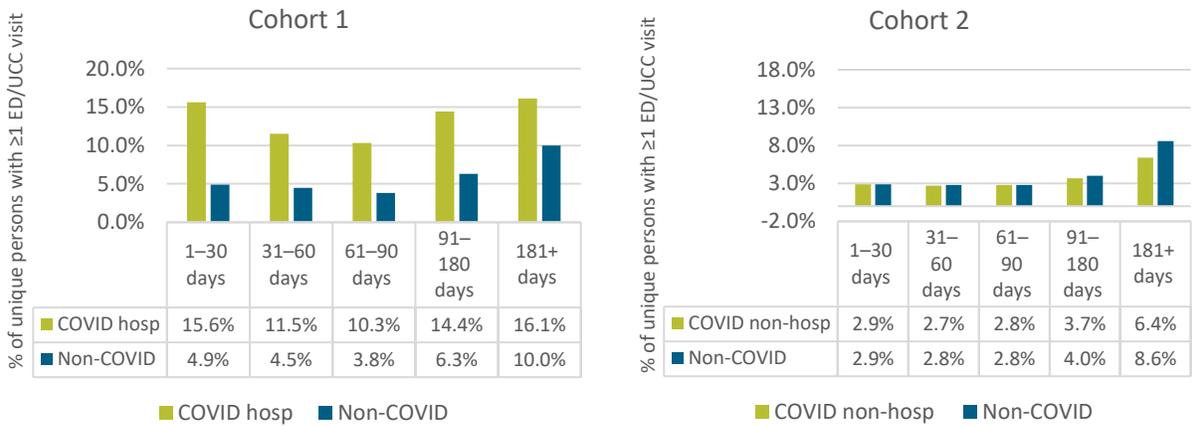


Figure 16: % Unique Persons with ≥1 ED/UCC Visit over Follow-up Period

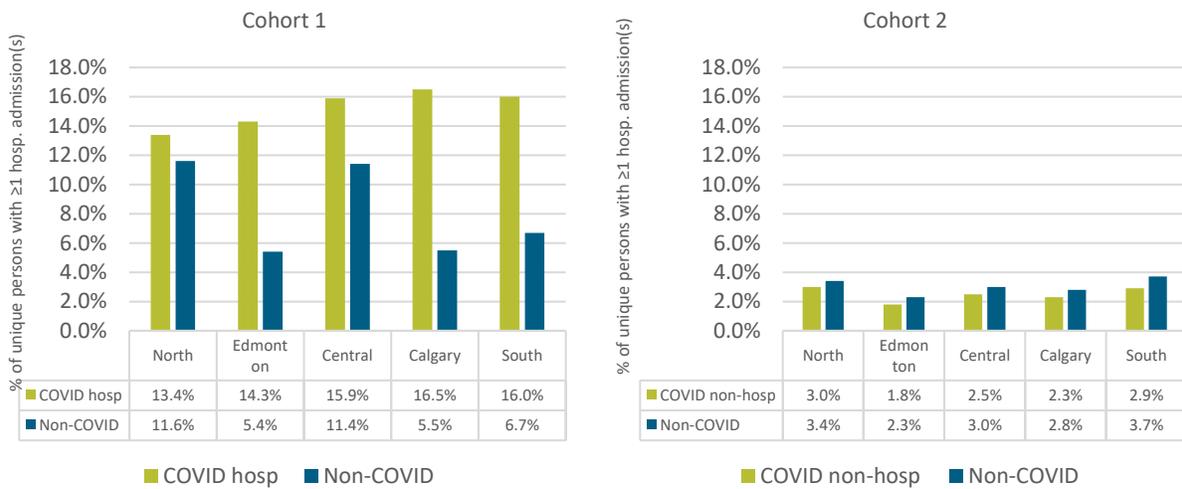


Figure 17: % Unique Persons with ≥1 Hospital Admission(s) by Zone



Health System – Key Messages

- Comparing WCBA data on the AHS workforce between 2020 and 2021 indicates a greater proportion of COVID-related claims in the latter year were in the North, Central, and South Zones.
- Non-hospitalized COVID-positive patients were relatively similar in their post-COVID healthcare utilization as matched non-COVID patients. This is evident across different areas of the healthcare system, across zones, and over time.
- Patients who were COVID-positive and hospitalized generally had far greater post-COVID healthcare utilization than non-COVID matched cases. This is evident across different areas of the healthcare system, across zones, and over time. This study includes large numbers in cohorts (Cohort 1 = 3,396; Cohort 2 = 95,389) and matches COVID-positive (hospitalized and non-hospitalized) patients with non-COVID patients by age, sex, zone, and test date.
- Data included in this report is raw and unadjusted.
- Still much is unknown about how individuals who live with PCC will utilize the health system over time.

PCC Dashboard Recommendations

Following this report, AHS will develop a dynamic dashboard that provides ongoing reporting on PCC in terms of disease characteristics, patient pathways, and health system utilization. As outlined in the [Data & Reporting Limitations](#) section, there are currently significant barriers to identifying and following patients who live with PCC across the health system. Accordingly, the Data & Reporting Working Group recommends that **initially, the dashboard data focus on a defined patient population** that is known to have tested positive for COVID-19 and has visited either one of the Specialty Pulmonary Clinics for concerns related to PCC or had been called by the Rehabilitation Advice Line. This defined patient population can then be followed and reported on over time. Accordingly, this will inform development of a consistent case definition for PCC.

Recommended metrics for the dashboard are listed below. These reflect a balance between what is feasible in terms of data collection with the most detailed and informative picture of how PCC continues to impact Alberta over time. It is anticipated that these metrics will evolve over time as our understanding of the case definition of PCC matures and AHS gains experience at identifying patients who live with PCC.

Dashboard Specifications

Patient Demographics

- Age
- Sex & Gender
- Zone
- Postal Code

Disease Characteristics

- Presenting Complaint
- Primary Diagnosis
- COVID-19 Diagnosis Date
- Comorbidities
- Patient Functional Scales
- Post-COVID Function

Patient Pathways to Info & Care

- RAL Call Volumes
- Specialty Clinics Volumes
- Specialty Clinics Wait Times
- Patient-Reported Outcome Measures (PROMS) & Patient-Reported Experience Measures (PREMS)
- e-Course Attendance
- Community Rehabilitation
- Client Referral Info System (CRIS)
- Addictions & Mental Health, Psychologist, Social Work

Health System

- ED/UCC Visit(s)
- ED/UCC Visit(s) 30 Days after Discharge
- Inpatient Length of Stay (LOS)
- Inpatient Discharge Disposition
- Wait Times for PCC Specialty Clinics
- Patient Experience and Outcomes
- 30 Day Readmission
- ICU Stay
- ICU LOS
- Healthcare Costs
- Primary Care Visits
- Community Rehabilitation Visits

Next Steps

In addition to continued monitoring through the creation and targeted use of a provincial PCC Dashboard to understand and support individuals living with PCC, the PCC Data & Reporting Working Group recommends:

1. Developing a **consistent case definition of PCC and encouraging consistent use of CIHI codes for PCC** as Connect Care continues to roll out across the province.
2. **Supporting data integration** by linking and integrating PCC-related datasets from AHS/Covenant Health with those of Primary Care and Continuing Care.
3. **Creating a Working Group to lead and support these objectives** that would consist of technical leaders from Data & Analytics and Public Health Surveillance and Zone Operational leaders.

4. **Building on the above recommendations to embed longitudinal tracking and predictive modeling** for PCC in AHS dashboards to support surveillance, reporting and service planning. The American Academy of Physical Medicine and Rehabilitation (AAPM&R) has developed a dashboard that may be instructive: <https://pascdashboard.aapmr.org/>.

Continuing to improve the breadth, accuracy, and effective use and reporting of PCC data will provide the information Alberta's health system needs to understand demand for services moving forward. This will also inform decisions about the care services, human resources, and financial planning required to support the health needs of a growing number of individuals in all parts of the province living with PCC.

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