



Rehabilitation & Allied Health Practice Considerations Post COVID-19

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Who will benefit from this resource?

This resource is intended to support rehabilitation and allied health providers across the care continuum who are working with patients recovering from symptoms of COVID-19. The recommendations in this document are intended to represent a biopsychosocial approach to care given the complex biological, physical, psychological, social, economic and spiritual needs of patients throughout their journeys throughout this pandemic.

The purpose of this document is not to outline all treatment approaches, rather it is intended to highlight **new** practice considerations when working with patients post-COVID.

The recommendations in this document are based on current evidence and were established through consultation with practice directors, physicians, rehabilitation and allied health staff. It is recognized that some patients may not have a confirmed diagnosis of COVID-19 but the treatment considerations outlined can be applied to anyone who experienced symptoms of COVID-19.

This document is meant to guide clinicians in their practice but treatment approaches should be adapted to meet the unique needs of each individual. Treatment approaches may also vary depending on the local context and services available in each zone.

Introduction

The majority of COVID-19 patients with mild symptoms will improve functionally in the 6-8 weeks following their illness. However, there may be some patients, including those experiencing long-term symptoms of COVID-19, who will benefit from rehabilitation and allied health services to aid in their recovery. For the purpose of this document, the term “**post-COVID**” is used to capture patients in both the sub-acute phase of recovery and those experiencing long-term symptoms.

COVID-19 patients who required an intensive care admission may have longer-term disability following discharge. It is anticipated that COVID will result in significant morbidity for 3 – 6 months, with pressure on routine medical and rehabilitation services for 12 months and beyond. As rehabilitation and allied health professionals, it is our role to help patients improve their exercise tolerance and functional activities while providing education and resources to support self-management over the longer term.

During the inpatient phase of recovery, patients tend to be more deconditioned and debilitated, thus treatment should focus on optimizing functional mobility and basic activities of daily living as well as education and supports to ensure safe discharge.

Those in the outpatient phase of recovery will likely have greater exercise tolerance but may still have poor reserve during exertion. Treatment options should continue to be targeted towards their functional impairments, similar to during the inpatient phase, however, focus should be placed on exercise tolerance as well as symptomology in the hours and days following exercise. Treatments should also focus on other long term impacts including psychosocial needs, spiritual well-being and community re-engagement.

At present, there is limited evidence to guide rehabilitation best practices for clients recovering from COVID-19. As a result, caution may be required, particularly when prescribing exercise to clients who present with any of the following physical sequelae:

- 1) Post-exertional symptom exacerbation
- 2) Cardiac symptoms
- 3) Significant dyspnea
- 4) Exertional oxygen desaturation
- 5) Dysautonomia and orthostatic intolerance

The guidelines in this document focus on the 5 physical sequelae mentioned above as well as general treatment recommendations for other post-COVID sequelae including cognitive changes, speech & language impairments, psychosocial impacts, etc.

The recommendations are based on current evidence (as of June 2021) and numerous published expert opinions. More detailed information and references are available at the end of the document. Every effort will be made to update the recommendations in this document as new evidence becomes available.

Table of Contents



[Supporting Self-Management](#)



[Screening, Flags & Referrals](#)



[Post Exertional Symptom Exacerbation](#)



[Cardiac Symptoms](#)



[Respiratory Symptoms \(including dyspnea and post-exertional oxygen desaturation\)](#)



[Dysautonomia & Orthostatic Intolerance](#)



[Joint and Muscle Pain](#)



[Pelvic Health Concerns](#)



[Activity & Exercise After COVID-19](#)



[Maximizing Energy: Returning to Daily Activities and Meaningful Occupations](#)



[Sleep](#)



[Cognition – Coming Soon](#)



[Voice, Speech and Respiration – Coming Soon](#)



[Eating, Feeding and Swallowing – Coming Soon](#)



[Psychological Impacts](#)



[Social Impacts – Coming Soon](#)



[Spiritual Impacts – Coming Soon](#)



[Nutrition](#)



[Outpatient Caseload Management & Prioritization](#)



Supporting Self-Management

Self-management is essential to optimizing health outcomes for those recovering from symptoms of COVID-19. These patients often require support to improve their confidence, skills, knowledge and motivation to manage the physical, social and emotional impacts associated with their illness.

Tips for Supporting Self-Management:

- Begin any program with the clinician explaining their role and allow time for the patient(s) to introduce themselves and state what they are hoping to gain from the service or program.
- Utilize active listening skills to identify knowledge gaps by finding out what the patient knows, expects and has tried.
- Consider the individual goals of the patient(s) and tailor education and treatment as needed.
- Consider involving patients in group programming so they can learn from other patients with similar issues or concerns.
- Support the patient in navigating the health care system by making them aware of the resources available.
 - All clients should be directed to the AHS Getting Healthy after COVID-19 website: [COVID-19 Getting Healthy after COVID-19 | Alberta Health Services](https://www.albertahealthservices.ca/assets/info/hp/phc/if-hp-phc-self-mgt-gen-tips-supporting.pdf)
 - The website above includes a link to the symptom self-management guide on My Health Alberta: [After COVID-19: Information and resources to help you recover \(alberta.ca\)](https://www.alberta.ca/after-covid-19-information-and-resources-to-help-you-recover.aspx)
- Provide information on other community supports and programs that may be available to assist the patient in their recovery.



Source: AHS Primary Health Care:

<https://www.albertahealthservices.ca/assets/info/hp/phc/if-hp-phc-self-mgt-gen-tips-supporting.pdf>



Screening, Flags and Referrals

Recovery from COVID-19 can be different for everyone. It is important for clinicians to be aware of the common symptoms of COVID-19, as well as “**red flag**” symptoms which may contraindicate certain treatment approaches or warrant further medical investigation. For the purpose of this document, “**yellow flags**” are used to describe symptoms or presentations that may warrant increased caution and monitoring.

The following section is intended to provide guidance on common symptoms to watch for and when it might be appropriate to refer a patient to another member of the health care team. Please keep in mind, monitoring of symptoms should occur throughout the patient’s rehabilitation journey.

Screening

To support clinicians in screening patients for common red flag symptoms, a screening tool for post-COVID physical sequelae has been developed. This tool incorporates validated outcome measures that can be used to assess patients for post-exertional symptom exacerbation, cardiac symptoms, significant dyspnea, exertional oxygen desaturation and dysautonomia.

This tool is meant to serve as a guide. Clinicians are responsible and encouraged to use clinical judgement to determine the level of assessment required for each individual patient.

See Appendix A for the [Screening Tool for Post-COVID Physical Sequelae](#)

Red Flags, Yellow Flags and Referrals

The following section outlines the most common red and yellow flags that clinicians may encounter when working with post-COVID patients. If these symptoms are identified on screening/assessment, clinicians are encouraged to follow the recommendations outlined.

Red Flags

- **Post Exertional Symptom Exacerbation (PESE)**
 - If a client screens positive for PESE on the [Screening Tool for Post COVID Physical Sequelae](#), activity and/or exercise must be titrated below the level that symptoms are exacerbated.
 - Typical graded exercise (i.e. overload principal) may be detrimental.
 - **Note:** PESE can occur at any time. Continue to monitor symptoms and re-screen as appropriate.
 - See the [Post Exertional Symptom Exacerbation](#) section for additional treatment recommendations.

□ **Myocarditis or known cardiac injury**

- The management of myocarditis or cardiac injury may vary depending on the patient's clinical presentation, age and activity level. Treatment decisions should be based on recommendations from the patient's cardiologist.
- For young and active patients with symptomatic myocarditis, it is recommended that patients not exercise beyond basic functional mobility and ADLs for 3-6 months after their illness, unless otherwise prescribed by their cardiologist. Following this, graded return to exercise is advised (Barker-Davies, 2020).
- See the [Cardiac Symptoms](#) section for additional treatment recommendations.

□ **Unexplained chest pain or tightness**

- Further medical assessment is warranted. Refer back to primary care provider or urgent care (depending on clinical presentation).

□ **Heart palpitations**

- Further medical assessment may be warranted. Refer back to primary care provider or urgent care (depending on clinical presentation).

□ **Significant Dyspnea**

- Patients who have shortness of breath at rest or during speaking, or those who score **4** on the adapted MRC breathlessness scale should be referred to primary care for further investigation (i.e. upper airway assessment, pulmonary function testing, cardiac assessment).
- Patients who score **≤3** on the adapted MRC breathlessness scale should be further assessed for exertional oxygen desaturation.
- See the [Screening Tool for Post-COVID Physical Sequelae](#) for details on the adapted MRC breathlessness scale.
- See the [Respiratory Symptoms](#) section for additional treatment recommendations.

□ **Exertional Oxygen Desaturation**

- Assessed using the 1 Minute Sit to Stand Test, the 2 Minute Step Test or the 6 Minute Walk Test.
- During mild exertion, a fall in oxygen saturation of $\geq 5\%$ **or** below 90% for patients without known lung pathology (88% with known lung pathology) is considered abnormal (ATS/ACCP 2003, Dempsey & Wagner 1985, Bota & Rowe 1995).

- Consider referral back to primary care provider for further medical investigation (i.e. pulmonary function testing, cardiac investigation, etc.).
 - If lung pathology is identified, consider referring to Pulmonary Rehabilitation.
 - See the [Respiratory Symptoms](#) section for additional information.
- **Postural Orthostatic Tachycardia Syndrome (POTS)**
- Sustained elevation of HR ≥ 30 bpm from baseline or ≥ 120 bpm, in the first 10 minutes of being in an upright position.
 - Refer back to primary care provider for further investigation and diagnosis (i.e. tilt-table assessment, ECG, echocardiogram, cardiac MRI, etc.).
 - See the [Dysautonomia and Orthostatic Intolerance](#) for additional treatment recommendations.

Yellow Flags

- **Elevated heart rate**
- Heart rate (HR) may increase quickly due to significant deconditioning. HR and heart rate recovery (HRR) should be monitored closely during exercise.
 - See the [Cardiac Symptoms](#) section for additional treatment recommendations.
- **Supplemental Oxygen Requirements**
- Where patients are on supplemental oxygen, saturation levels should be monitored prior to, during and following exercise.
 - Patients on supplemental oxygen may have increased oxygen requirements on exertion or with activity. Check with the patient if they have been given target oxygen parameters by their physician.
 - See the [Respiratory Symptoms](#) section for additional treatment recommendations.
- **Orthostatic Hypotension**
- A fall in SBP of >20 mm Hg or DBP >10 mm Hg from baseline within 3 minutes in an upright position.
 - If symptoms of OH are extremely limiting, consider referral back to the primary care physician for pharmacological management.



If clients do not have a primary care physician they can search: <https://albertafindadoctor.ca/> or call Health Link (811)



Post Exertional Symptom Exacerbation (PESE)

Fatigue and post-exertional malaise (PEM) are some of the most common symptoms reported after COVID-19 (Hannah Davis 2020). Post-exertional malaise is also described as post-exertional symptom exacerbation (PESE) which can be defined as the triggering or worsening of symptoms following physiological stress and/or cognitive activity (Mateo 2020). Symptom exacerbation typically occurs 12 to 48 hours after activity and can last for days or even weeks.

Post-exertional malaise/symptom exacerbation is a hallmark symptom of myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS), a disease characterized by profound fatigue, cognitive dysfunction, sleep abnormalities, autonomic manifestations, pain, and other symptoms that are made worse by exertion. ME/CFS may be suspected if symptoms are present for at least 6 months or more (Shepard 2020).

A subset of questions from the DePaul Symptom Questionnaire have been validated for evaluating PEM in people with ME/CFS (Cotler et al., 2018). Recently, this tool has been used to evaluate the frequency and severity of PESE in post-COVID patients. This tool has been incorporated into the [Screening Tool for Post-COVID Physical Sequelae](#) which can be administered at any time during a patients recovery from COVID-19.

☐ **Red Flag: Post Exertional Symptom Exacerbation**

- If a client screens positive for PESE on the [Screening Tool for Post COVID Physical Sequelae](#), activity and/or exercise must be titrated below the level that symptoms are exacerbated.
- Typical graded exercise (i.e. overload principal) may be detrimental.
- **Note:** PESE can occur at any time. Continue to monitor symptoms and re-screen as appropriate.

Treatment Considerations:

Treatment should be focused on patient education regarding activity pacing and energy conservation. See the [Maximizing Energy](#) section for more detailed information on pacing.

☐ Four basics of energy conservation:

- **Planning** – Educate patients on the importance of planning their days. Try to spread out important physical or mental tasks that need to be done and break activities into smaller, more manageable chunks. Planning needs to be flexible as energy reserves may fluctuate significantly from day-to-day.

- **Prioritizing** – Help patient prioritize activities that are important to them (i.e. physical, mental, social and family activities). Activities should be sorted into those that need to be done and those that can be deferred.
- **Delegating** – Encourage patients to consider activities that they might be able to delegate to family members or friends.

Explaining – Help patients understand their condition so they can explain it to others and advocate for themselves.

- Patients may benefit from instruction in the use of diaphragmatic breathing and pursed-lip breathing to promote parasympathetic activation and respiratory efficiency.
- If a patient is demonstrating viral symptom recurrence (i.e. fatigue, cough, headache, shortness of breath, etc.), reduce the intensity of your intervention and complete and activity log to determine how to best support the patient in their recovery.
- Appointment attendance and travel may contribute to symptom burden or exercise intolerance. Consider providing in-person care in reduced frequency, or through virtual care delivery (individual or group).
- Patients with PESE or ME may take longer to recover between sessions. For this reason, it may be appropriate to consider shorter treatment sessions spread out over a longer period of time. Programs may need to consider their usual models of care (i.e. discharging patients after 6-8 weeks of therapy) as this may not be appropriate for this population.
- Patients with PESE or ME may be unable to return to their regular work and leisure activities. A multidisciplinary approach to the client's treatment plan is strongly encouraged.
- It is important to recognize patients may not fully recover from PESE or ME during their time in rehabilitation. Clinicians should promote [self-management](#) **early** in the treatment process to empower patients and facilitate smooth transitions in care.

Considerations for Activity Progression:

- Be aware of the signs and symptoms of orthostatic intolerance and how to manage it (i.e. limit standing and encourage clients to lay down when needed).

- Consider the use of a HR monitor and encourage patients to keep their HR below their anaerobic threshold (~60% of HR max). To calculate an estimated, use the following formula $(220 - \text{age}) \times 0.55 = \text{anaerobic threshold in beats per minute}$.
 - Keep in mind, the anaerobic threshold may be lower for severely ill patients and symptoms should always be used to guide intervention.
- As the patient progresses and activity tolerance improves, consider in-person sessions focusing on gradual return to activity and exercise.
- Treatments may begin with gentle stretching and strengthening exercises, progressing to aerobic activities as tolerated. Increases in activity intensity and duration should only be attempted if the patient has recovered after an hour and fatigue levels are normal.
- A patient's activity tolerance may vary significantly from day-to-day. Clinicians will need to continuously monitor symptoms and adapt their treatment approach accordingly.

Recommended Outcome Measures:

- Borg Scale CR10 for Shortness of Breath and Fatigue
 - Scale ranging from 0-10, which provides clinical information on the patient experience on shortness of breath and fatigue.
[Borg Rating Of Perceived Exertion - Physiopedia \(physio-pedia.com\)](https://www.physio-pedia.com/Borg_Rating_Of_Perceived_Exertion)



Resources:

- Post COVID-19 Fatigue, Post/Long COVID-19 Syndromes and Post-COVID ME/CFS: [MEA-Covid-19-MECFS-Post-Covid-Fatigue-Syndromes-and-Management-November-2020.pdf \(meassociation.org.uk\)](https://www.meassociation.org.uk/MEACovid19MECFSPostCovidFatigueSyndromesandManagementNovember2020.pdf)
- Beyond Myalgic Encephalomyelitis/Chronic Fatigue Syndrome: Report Guide for Clinicians: <https://www.nap.edu/resource/19012/MECFSCliniciansguide.pdf>
- Physiotherapy for ME: [Home | Physiosforme](#)



Cardiac Symptoms

COVID-19 typically presents with signs and symptoms of a respiratory tract infection, although cardiac manifestations including arrhythmias, myocardial injury and heart failure are commonly reported (Pellicori et al, 2021).

Cardiac involvement should be considered in patients presenting with a history of new-onset chest pain/pressure, heart palpitations, breathlessness, or exercise induced dizziness or syncope. Collaboration with other health care providers including primary care, cardiologists and other specialists can help to ensure the best possible management of patients with cardiac manifestations following COVID-19.

□ **Red Flag: Myocarditis or known cardiac injury**

- The management of myocarditis or cardiac injury may vary depending on the patient's clinical presentation, age and activity level. Treatment decisions should be based on recommendations from the patient's cardiologist.
- For young and active patients with symptomatic myocarditis, it is recommended that patients not exercise beyond basic functional mobility and ADLs for 3-6 months after their illness, unless otherwise prescribed by their cardiologist. Following this, graded return to exercise is advised (Barker-Davies, 2020).

□ **Red Flag: Heart palpitations**

- Further medical assessment may be warranted. Refer back to primary care provider or urgent care (depending on clinical presentation).

□ **Red Flag: Unexplained chest pain or tightness**

- Further medical assessment may be warranted. Refer back to primary care provider or urgent care (depending on clinical presentation).

□ **Yellow Flag: Elevated heart rate**

- Heart rate (HR) may increase quickly due to significant deconditioning. HR and heart rate recovery (HRR) should be monitored closely during exercise.

Treatment Considerations:

- Patients should receive education on signs and symptoms to watch out for and when to seek urgent medical attention (i.e. sudden chest pain that persists for >15 minutes, chest pain associated with nausea or vomiting, loss of consciousness, tachycardia or dyspnea at rest, etc.).
- Ensure patients perform a proper warm-up and cool-down (~5 minutes), before and after exercising.
- Consider the use of a HR monitor and start exercise below the patient's anaerobic threshold (~60% of HR max). To calculate an estimate, use the following formula $(220 - \text{age}) \times 0.55 = \text{HR below expected anaerobic threshold in beats per minute}$.
 - Keep in mind, the anaerobic threshold may be lower for severely ill patients and symptoms should always be used to guide intervention.
 - Tolerance should be evaluated for each patient before progressing the duration or intensity of exercise. Consider the FITT principles – frequency, intensity, type and time.
- Monitor heart rate recovery (HRR) post exercise. HRR is defined as the difference between HR at peak exercise and exactly 1 minute into the recovery period. A HRR value ≤ 12 bpm is considered abnormal and may warrant further medical investigation (Jolly et al., 2011).
- Monitor patient for abnormal responses to activity (i.e. arrhythmias, rapid increase or decrease in blood pressure, disproportionate breathlessness, lower extremity swelling, etc.).
- Consider referral back to primary care provider or cardiologist if required.



Resources:

- [The Stanford Hall consensus statement for post-COVID-19 rehabilitation | British Journal of Sports Medicine \(bmj.com\)](#)
- Post-COVID Heart Rate Monitoring: [Heart Rate Monitoring — Long COVID Physio](#)
- [Impact of Exercise on Heart Rate Recovery | Circulation \(ahajournals.org\)](#)



Respiratory Symptoms

Long term respiratory symptoms are present in up to 29% of COVID-19 survivors (Huang 2021). Common respiratory symptoms include dyspnea (shortness of breath), exertional oxygen desaturation and chronic cough.

Dyspnea is one of the most common respiratory symptoms in this population. This may be due to lung damage, deconditioning, upper airway injury, breathing pattern disorders, cardiac impairment, fatigue, or anxiety and it is often a major limiting factor in rehabilitation. Having dyspnea in the acute phase of the illness (defined as day 7 after symptom onset), or having a history of asthma or chronic lung disease, is associated with a higher risk for prolonged or chronic dyspnea (Carvalho-Schneider et al., 2020; Cellai & O'Keefe, 2020).

Another concerning symptom from a rehabilitation perspective is exertional oxygen desaturation. Generally, oxygen saturation levels should be above 95% though this may differ in patients with known lung disease, where above 88% may be acceptable (Zhao et al. 2020). Lower oxygen saturation levels after exercise have been observed in patients with acute COVID-19 but it can also occur during the recovery phase making it an important safety consideration when working with post-COVID patients (Greenhalgh, 2020).

□ **Red Flag: Significant Dyspnea**

- Patients who have shortness of breath at rest or during speaking, or those who score **4** on the adapted MRC breathlessness scale should be referred to primary care for further investigation (i.e. upper airway assessment, pulmonary function testing, cardiac assessment).
- Patients who score **≤3** on the adapted MRC breathlessness scale should be further assessed for exertional oxygen desaturation.
- See the [Screening Tool for Post-COVID Physical Sequelae](#) for details on the adapted MRC breathlessness scale.
- See the [Respiratory Symptoms](#) section for additional treatment recommendations for dyspnea.

□ **Red Flag: Exertional Oxygen Desaturation**

- Assessed using the 1 Minute Sit to Stand Test, the 2 Minute Step Test or the 6 Minute Walk Test.
- During mild exertion, a fall in oxygen saturation of $\geq 5\%$ **or** below 90% for patients without known lung pathology (88% with known lung pathology) is considered abnormal (ATS/ACCP 2003, Dempsey & Wagner 1985, Bota & Rowe 1995).

- Consider referral back to primary care provider for further medical investigation (i.e. pulmonary function testing, cardiac investigation, etc.).
 - If lung pathology is identified, consider referring to Pulmonary Rehabilitation.
 - See the [Respiratory Symptoms](#) section for additional information.
- **Yellow Flag: Supplemental Oxygen Requirements**
- Where patients are on supplemental oxygen, saturation levels should be monitored prior to, during and following exercise.
 - Patients on supplemental oxygen may have increased oxygen requirements on exertion or with activity. Check with the patient if they have been given target oxygen parameters by their physician.
 - See the [Respiratory Symptoms](#) section for additional treatment recommendations.

Dyspnea/Shortness of Breath

Treatment Considerations:

- **Dysfunctional Breathing Patterns:** Shortness of breath is a commonly reported persistent symptom, which may exist in the absence of underlying disease (Ionescu et al, 2021). Dysfunctional breathing patterns may present as hyperventilation, exertional hyperventilation, apical breathing pattern dominance, lack of breath control, and activity avoidance (Motiejunaite et al, 2021).
 - Normal, quiet breathing is performed through the nose, with minimal accessory muscle involvement, at a rate of 12-20 breaths/minute.
 - If your patient is presenting with difficulty controlling their breathing at rest or with exertion, consider performing a basic chest assessment to determine if your patient may benefit from breathing retraining.
- Provide education on positions to ease shortness of breath (i.e. high side-lying, forward leaning, etc.).
- Review common breathing techniques:
 - **Pursed-lip breathing instructions:**
 - Breathe in through your nose and out through your mouth while pursing your lips, as if you were about to blow out candles on a cake.
 - Breathe in for about 2 seconds and breathe out for 4-6 seconds.

- **Diaphragmatic breathing instructions:**
 - Sit or lay in a comfortable and supported position.
 - Put one hand on your chest and the other on your belly.
 - If it helps you to relax, close your eyes (otherwise leave them open) and focus on your breathing.
 - Slowly breathe in through your nose (or mouth if you are unable to easily breathe with your nose) then out through your mouth.
 - When you breathe in, push your belly out as far as possible.
 - When you breathe out, you should feel your belly move in.
 - Try to use as little effort as possible and make your breaths slow, relaxed, and smooth.

- **Paced breathing instructions:**
 - Think about doing the hardest tasks in a part of your day when you have the most energy.
 - Breathe in before you make the 'effort' of the task, such as before you climb up a step.
 - Breathe out while making the effort, such as climbing up a step.
 - You may find it helpful to breathe in through your nose and out through your mouth, using the pursed lip breathing technique (see above).

- In the early stages of rehabilitation (acute care and/or early inpatient rehabilitation, around 6-8 weeks post-COVID), patients should resume activity at a level of 3/10 on the modified Borg Scale (Spruit et al, 2020).

- As activity tolerance improves, patients can be progressed to exercise at a level of up to 6/10 on the modified Borg Scale. Emphasis should be placed on breath control and when progressing activity, regular monitoring of symptoms should occur.

Exertional Oxygen Desaturation

Considerations for Assessment:

- Currently, there are no validated tools to evaluate exertional oxygen desaturation in post-COVID patients. The 1 minute sit-to-stand (1MSTS) test correlates well with the 6-minute walk (6MWT) test and has been validated on chronic interstitial lung disease and airway obstruction.
- The 1MSTS test has been proposed as an appropriate method to evaluate exertional desaturation in post-COVID populations but testing should not take place outside a supervised setting unless the patient's resting SpO₂ is ≥96% (Greenhalgh et al., 2020).
- If the 1MSTS test is used, clients should be monitored for at least 1 minute following completion of the test to observe for exertional oxygen desaturation.
- The 2 minute step test (TMST) also correlates well with the 6MWT, and may be used to assess for exertional desaturation, especially for individuals with mobility/strength limitations for whom the 1MSTS may be too difficult to complete (Hameed, 2021).
- Assessment should include monitoring of hyperventilation or breathing pattern disorders. Hyperventilation can result in a variety of symptoms including dyspnea, chest pain, tachycardia, fatigue, dizziness, and syncope on exertion (Motiejunaite et al., 2021).
- Patients should be advised to terminate any test if they develop adverse symptoms (i.e. severe breathlessness, chest pain or dizziness).

Treatment Considerations:

- The use of pulse oximetry under clinical supervision has been recommended for post-COVID patients experiencing respiratory symptoms, especially during phases of activity progression (Greenhalgh et al., 2020).
- In the early stages of rehabilitation (acute care and/or early inpatient rehabilitation, around 6-8 weeks post-COVID), patients should resume activity at a level of 3/10 on the modified Borg Scale (Spruit et al, 2020).
- If patients exhibit signs of exertional oxygen desaturation, the patient should be referred back to their primary care provider for further investigation.
 - If medically cleared, treatment should focus on pacing and symptom titrated return to activity.

Managing a Chronic Cough

Treatment Considerations:

- For a non-productive cough:
 - Provide patients with education on breathing/coughing techniques (i.e. huffing to avoid vocal cord trauma), sleep positioning at night (extra pillow if needed) and support smoking cessation.
 - Refer patient to online self-management resources: [After COVID-19: Information and resources to help you recover \(alberta.ca\)](#)

- For a productive cough:
 - In the acute care setting, airway clearance techniques such as active cycle of breathing, percussions and vibrations, assisted cough maneuvers, mechanical insufflation-exsufflation and/or mobilization may be indicated for patients with confirmed or suspected COVID-19 who develop exudative consolidation, mucous hypersecretion and/or difficulty clearing secretions (Thomas et al., 2020).
 - For chronic productive coughs, educate on the importance of routine airway clearance and provide instruction on specific techniques which may include mobility/exercise, deep breathing and huff coughing, autogenic drainage, active cycle of breathing, and if indicated, positive expiratory pressure therapy (Thomas et al., 2020, McIlwaine, 2006).

Recommended Outcome Measures:

- Borg Scale CR10 for Shortness of Breath and Fatigue
 - Scale ranging from 0-10, which provides clinical information on the patient experience on shortness of breath and fatigue.
[Borg Rating Of Perceived Exertion - Physiopedia \(physio-pedia.com\)](#)

- Modified Medical Research Council Breathlessness Scale
 - Stratifies severity of dyspnea in respiratory diseases.
[mMRC \(Modified Medical Research Council\) Dyspnea Scale - MDCalc](#)

- 1 Minute Sit to Stand Test
 - Patient is encouraged to transition from sitting to standing as many times as possible in 1 minute without the use of upper extremities (if possible).

- 2 Minute Step Test
 - Patient is encouraged to march in place as fast as possible for 2 minutes while lifting knees to a height midway between their patella and iliac crest.
[2 Minute Step Test - \(trekeducation.org\)](http://trekeducation.org)

- 6 Minute Walk Test
 - Sub-maximal exercise test used to assess aerobic capacity.
[Six Minute Walk Test / 6 Minute Walk Test - Physiopedia \(physio-pedia.com\)](http://physio-pedia.com)



Resources:

- AHS Patient Education Resource: [Symptoms: Coughing \(alberta.ca\)](http://alberta.ca)
- COPD: Learning to Breathe Easier [COPD: Learning to Breathe Easier \(alberta.ca\)](http://alberta.ca)
- Breathing Techniques for COPD: [Breathing Techniques for COPD: Care Instructions](#)
- [Coronavirus Recovery: Breathing Exercises | Johns Hopkins Medicine](#)
- [Breathing Pattern Disorders - Physiopedia \(physio-pedia.com\)](http://physio-pedia.com)



Dysautonomia & Orthostatic Intolerance

Dysautonomia is a term used to describe a range of clinical conditions characterized by dysfunction in the autonomic nervous system (Rocha et al., 2021). Recent evidence suggests post-COVID patients may experience dysautonomia in the form of orthostatic intolerance or postural orthostatic tachycardia syndrome (POTS) (Raj et al, 2021).

Orthostatic intolerance (OI) syndromes refer to conditions in which the upright position (most often the movement from lying or sitting to standing) causes symptomatic arterial hypotension. This occurs as a result of reduced blood volume or when the autonomic nervous system fails to respond to the challenges imposed by upright positioning (Brignole, 2007). A common presentation of OI is orthostatic hypotension (OH) which is defined as a fall in systolic blood pressure (SBP) >20 mmHg or a fall in diastolic blood pressure (DBP) >10 mmHg from baseline within 3 minutes in an upright position (Lahrman et al., 2006). Typically, this presents with signs of cerebral hypoperfusion including dizziness and presyncope (Brignole, 2007).

Postural orthostatic tachycardia syndrome (POTS) is characterized by sustained increase in heart rate ≥ 30 bpm or ≥ 120 bpm, in the first 10 minutes of being in an upright position, without classical orthostatic hypotension associated. Other symptoms such as dizziness, weakness, presyncope and heart palpitations are also common (Rocha et al. 2021).

Note: Many symptoms of orthostatic hypotension and POTS are difficult to differentiate from cardiac conditions. As a result, it is important to assess heart rate parameters and orthostatic hypotension if these conditions are suspected.

□ **Red Flag: Postural Orthostatic Tachycardia Syndrome (POTS)**

- Sustained elevation of HR ≥ 30 bpm from baseline or ≥ 120 bpm, in the first 10 minutes of being in an upright position.
- Refer back to primary care provider for further investigation and diagnosis (i.e. tilt-table assessment, ECG, echocardiogram, cardiac MRI, etc.).

□ **Yellow Flag: Orthostatic Hypotension**

- A fall in SBP of >20 mm Hg or DBP >10 mm Hg from baseline within 3 minutes in an upright position.
- If symptoms of OH are extremely limiting, consider referral back to the primary care physician for pharmacological management.

Treatment Considerations:

- Provide education on how to manage/prevent episodes of orthostatic hypotension or POTS (i.e. laying down until symptoms resolve, rising slowly after lying down, avoiding long periods of standing, drinking plenty of fluids, wearing support stocking or compressive clothing, etc.).
- Consider a holistic treatment approach addressing topics such as: physical activity, mental well-being, pacing, sleep, nutrition, stress management, breathing and medication.
- Provide education on breathing techniques (i.e. diaphragmatic breathing) and activity pacing to assist clients with return to activity.
- If medically cleared by a physician, structured exercise including aerobic reconditioning and strength training may be considered for patients with POTS (Fu and Levine, 2018).
- Physical activity and exercise should be adjusted based on symptoms, which may fluctuate from day-to-day. This may be referred to as “symptom titrated physical activity” (National Institute of Health Research, 2021).
- During the initial stages of rehabilitation, non-upright exercises (i.e. recumbent cycling, swimming, seated resistance training, etc.) may be more suitable for patients who have significant symptoms in standing (Dani et al., 2020).
- Autonomic Conditioning Therapy (ACT) may help to reduce fatigue and improve symptoms of autonomic dysfunction in post-COVID patients (Puttrino et al., 2021).

Recommended Outcome Measures:

- Active Stand Test
 - Blood pressure and HR are measured after 5 minutes in supine, then immediately upon standing and at 2, 5 and 10 minutes.

[PoTS - Postural Tachycardia Syndrome \(potsuk.org\)](https://potsuk.org)



Resources:

- Patient information: [Learning About Postural Orthostatic Tachycardia Syndrome \(POTS\)](#)
- NHS POTS information: [Postural tachycardia syndrome \(PoTS\) - NHS \(www.nhs.uk\)](https://www.nhs.uk)
- UK website with patient resources: [PoTS - Postural Tachycardia Syndrome \(potsuk.org\)](https://potsuk.org)
- Autonomic Conditioning Therapy protocol: [Autonomic conditioning therapy reduces fatigue and improves global impression of change in individuals with post-acute COVID-19 syndrome | Research Square](#)



Joint and Muscle Pain

Joint pain (arthralgia) and muscle pain (myalgia) are common symptoms in the acute stages of COVID-19 but these symptoms are also displayed in the post-COVID population. Although prevalence varies, some research suggests up to 60% of post-COVID patients may experience persistent symptoms of joint and muscle pain (Galal et al., 2021). Treating arthralgia and myalgia is an important priority for rehabilitation professionals as these conditions can significantly impact function, return to regular activity and psychological well-being. The treatment strategies used to manage pain in the general population will still apply when working with clients after COVID-19 (Wang et al., 2020).

Treatment Considerations:

- Provide education on pain management strategies (i.e. heat, ice, joint protection strategies, etc.).
- Consider gentle stretching, range of motion and strengthening activities.
- Clients may benefit from medication including muscle relaxants or non-steroidal anti-inflammatory (NSAID) medications.
- If pain is not resolving or if patient presents with an exaggerated pain response, consider referring back to the primary care physician for further medical investigation. Referral to chronic pain programs may also be warranted if symptoms persist beyond a reasonable time frame.



Resources:

- AHS Patient Education Resource: [Symptoms: Joint and muscle pain \(alberta.ca\)](https://www.alberta.ca/symptoms-joint-and-muscle-pain.aspx)



Pelvic Health Concerns

Although pelvic health concerns are not commonly reported in the literature related to COVID-19, recent studies suggest post-COVID patients may experience increased urinary frequency, nocturia (>4 episodes/night) and incontinence (Dhar et al., 2020). Although the exact mechanism behind these changes is unknown, both respiratory dysfunction and hospitalization can have an impact on pelvic floor function. It is hypothesized that the residual respiratory symptoms of COVID-19, including chronic cough and shortness of breath, may contribute to pelvic floor dysfunction and worsening urinary or fecal incontinence and/or pelvic organ prolapse (Siracusa & Gray, 2020).

Treatment Considerations:

- Education is a key component of treatment. Patients should receive an explanation of the pathophysiology of pelvic floor conditions and how COVID-19 might contribute to worsening symptoms.
- Patients can watch AHS approved online videos outlining the anatomy and pathophysiology of pelvic floor conditions. Videos are available under the patient education tab on the AHS Pelvic Floor Health webpage: [Pelvic Floor Health | Alberta Health Services](#)
- Traditional pelvic floor strengthening programs can be easily individualized for the post-COVID population. If patients are experiencing proximal muscle fatigue, pelvic floor contraction sets can be prescribed with longer rest breaks and exercises can be performed in a semi-reclined or supine position to reduce the demand on the diaphragm and the pelvic floor (Siracusa & Gray, 2020).
- Consider referring to a Physical Therapist who is authorized by Physiotherapy Alberta in the performance of pelvic floor rehabilitation. [Physiotherapy Alberta College + Association : The Movement Specialists: Physiotherapist Directory](#)



Resources:

- Pelvic floor information and exercises: [Pelvic Floor First](#)



Activity & Exercise After COVID-19

“Physical activity” and “exercise” are two distinct terms which are often used interchangeably. It is important to make a distinction between these terms as it may have impacts on rehabilitation recommendations for the post-COVID population. Physical activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure. It can be categorized into occupational activities, sports, conditioning, household or other activities (Caspersen et al., 1985). Participating in activities of daily living is considered to be a physical activity.

Exercise on the other hand, is a subset of physical activity that is planned, structured and repetitive with the objective being the improvement or maintenance of physical fitness (Caspersen et al., 1985). Exercise therapy used to treat health conditions would fall into this category an examples might include: aerobic training, strength, balance, range of motion exercises, etc.

In the post-COVID population, return to activity and exercise are important goals but exercise should not take precedent over return to regular activities of daily living. It’s important to consult with patients to determine their functional goals and activities they want to focus on.

Treatment Considerations:

- ❑ Before beginning an exercise program, it is important to complete the [Screening Tool for Post-COVID Physical Sequelae](#) to identify any red flags or contraindications for exercise.
- ❑ Physical activity and exercise should be adjusted based on symptoms which may fluctuate from day-to-day. This may be referred to as “symptom titrated physical activity” (National Institute of Health Research, 2021).
- ❑ If patients have limited tolerance or struggle with fatigue, the emphasis of treatment should be placed on energy conservation and return to activities of daily living prior to initiating a therapeutic exercise program.
- ❑ Patients should only exercise if they feel recovered from the previous day and have no new onset or return of symptoms (Salman et al., 2021).
- ❑ There is no clear evidence based guideline for returning patients to physical activity and exercise but a prudent approach would be gradual, individualized and based on subjective tolerance and symptoms (Salaman et al., 2021).

- Patients should receive education on signs and symptoms to monitor during physical activity and exercise and when they should seek medical attention (i.e. chest pain, palpitations, disproportionate breathlessness, dizziness, etc.).



Resources:

- AHS Patient Education Resource: [Exercising and being active \(alberta.ca\)](#)
- Returning to physical activity after COVID-19: [Returning to physical activity after covid-19 | The BMJ](#)
- Graduated return to play guidance for performance athletes: [Suggested-Grad-RTP-Progression-Parents.pdf \(umich.edu\)](#)



Maximizing Energy: Returning to Daily Activities and Meaningful Occupations

Traditionally, chronic disease management strategies included the concept of 'energy conservation'. More recently, feedback from clients has indicated a preference for the term 'energy maximization'. This is seen as more client centered and emphasizes a strength-based, positive approach.

Some people who are recovering from COVID-19 experience times where they feel exhausted, have difficulty thinking, and other symptoms after a minimal amount of activity – this is known as post-exertional malaise (PEM). Some people with PEM experience a cycle of 'push and crash' or 'boom and bust' and find themselves caught in a frustrating loop. By identifying limits and staying within them, clients recovering from COVID can avoid this cycle and have more success in returning to activities. Staying within limits requires pacing or spreading out activities into 'little bits' with rest periods in between. Once out of the Push/ Crash cycle, clients can begin to carefully increase their activity level. This can be a challenge for some people and working with an OT can support developing these skills.

Collaborative goal setting conversations can be the first step in identify client-centered goals and priorities for allocating energy. Once goals have been established, tracking of activities and energy levels is a valuable tool to understand energy utilization patterns and occupational participation. Guided discussions can support clients to incorporate energy maximization into their daily/weekly routines with an emphasis on pacing. It is also important for clients to understand that participating in cognitively, emotionally, or spiritually demanding activities also requires energy and need to be balanced. General energy maximization principles of *Pace, Plan, Positioning and Prioritize* can be utilized by clients with COVID-19 and they may benefit from additional discussions about precautions specific to COVID (see previous sections). Handouts such as the RCOT [*How to conserve your energy: Practical advice for people during and after having COVID-19*](#) provide specific tips for basic and instrumental activities of daily living. Adapted equipment and aids such as bathing or mobility aids may be useful in conserving energy and short term equipment loans or rentals can be discussed.

Most COVID 19 clients anticipated a short term illness and are coming to terms with making lifestyle adjustments to manage their recovery. Their thoughts and emotions can impact successful implementation of energy maximization techniques. A discussion of barriers can be integral to success.

□ **Red Flag: Significant Dyspnea**

- Patients who have shortness of breath at rest or during speaking, or those who score **4** on the adapted MRC breathlessness scale should be referred to primary care for further investigation (i.e. upper airway assessment, pulmonary function testing, cardiac assessment).
- Patients who score **≤3** on the adapted MRC breathlessness scale should be further assessed for exertional oxygen desaturation.
- See the [Screening Tool for Post-COVID Physical Sequelae](#) for details on the adapted MRC breathlessness scale.
- See the [Respiratory Symptoms](#) section for additional treatment recommendations for dyspnea.

□ **Red Flag: Unexplained chest pain or tightness**

- Further medical assessment may be warranted. Refer back to primary care provider or urgent care (depending on clinical presentation).

□ **Yellow Flag: Elevated heart rate**

- Heart rate (HR) may increase quickly due to significant deconditioning. HR and heart rate recovery (HRR) should be monitored closely during exercise.

□ **Yellow Flag: Psychological Changes**

- Repeated reports of 'low energy' in combination with low mood, changes in appetite and/or sleep may be indicators of depression and may warrant further screening.

Recommended Outcome Measures:

- [Canadian Occupational Performance Measure](#)
 - Assesses an individual's perceived occupational performance in the areas of self-care, productivity and leisure. Extremely valuable in helping patients identify what are their priorities for maximizing energy.
- [Fatigue Severity Scale](#), [Modified Fatigue Impact Scale](#) or [Brief Fatigue Index](#)
- Modified Medical Research Council Breathlessness Scale
 - Stratifies severity of dyspnea in respiratory diseases.
[mMRC \(Modified Medical Research Council\) Dyspnea Scale - MDCalc](#)



Resources:

- [Post-Exertional Malaise in Post COVID Recovery](#)
- [Chronic Fatigue Syndrome and Fibromyalgia](#)
- AHS Patient Education Resource: [Self-care: Managing your energy \(alberta.ca\)](#)
- Energy conservation for COPD and other chronic conditions: [Conserving Energy When You Have COPD or Other Chronic Conditions \(alberta.ca\)](#)
- Early concussion education on pacing and energy conservation: [Pacing and Energy Conservation \(alberta.ca\)](#)
- Practical advice for people during and after COVID-19: [How to conserve your energy - RCOT](#)



Sleep

Sleep quantity and quality are important factors in overall wellness. Insufficient sleep has been linked to a variety of negative health impacts including increased risk of obesity, cardiovascular disease and mood and cognitive disorders (Mendelkorn et al., 2021). Since the start of the pandemic, there has been an increased prevalence of sleep disturbances among the general population as well as COVID-19 survivors. According to current evidence, sleep disorders impact approximately 40% of general population and health care workforce, while up to 75% of patients with COVID-19 experience sleep disturbances. Often times, sleep related issues such as insomnia persist well beyond the acute phase of COVID-19 (Jahrami et al., 2021).

Supporting clients with sleep disorders is an important priority for rehabilitation professionals as impaired sleep can significantly impact participation and overall recovery.

- **Red Flags:** High Risk STOP BANG screen score, recommend returning to primary care physician for referral for Level 3 (in home) sleep study.

- **Yellow Flags:** Poor sleep, in combination with changes in appetite, feelings of low mood or incessant worrying may be indicators of depression or anxiety disorders and may warrant further screening or referral. Reports of off-label medication use or alcohol use may warrant further screening or referral.

Treatment Considerations:

- Consider using a sleep diary/journal as well as a daily routine journal to establish sleep habits as well as activity level during the day. It may be helpful to consider pre-COVID sleep habits as well.

- Provide education on sleepiness versus fatigue. This can allow a better understanding of the lived experience is for each patient.

- Consider providing resources on mind/body calming skills such as: mindfulness, guided imagery, progressive muscle relaxation, diaphragmatic breathing, etc. Achieving confidence with the skill prior to using it for sleep initiation is recommended.

Recommended Outcome Measures:

- STOP-Bang Questionnaire (Sleep Apnea Screen): [The Official STOP-Bang Questionnaire Website \(stopbang.ca\)](http://stopbang.ca)
- Sleep Hygiene Index: [Sleep Hygiene Index \(SHI\) - Zesty Sleep](#)
- Pittsburgh Sleep Quality Index (PSQI): <https://www.opapc.com/uploads/documents/PSQI.pdf>



Resources:

- AHS Patient Education Resource: [Self-care: Sleeping well \(alberta.ca\)](#)
- Patient sleep journal: [Sleep Journal \(alberta.ca\)](#)
- Tips to improve sleep: [30 Days to a Well-Rested You \(albertahealthservices.ca\)](#)
- General information about sleep disorders: [Sleep Problems, Age 12 and Older](#)



Cognition – Coming Soon



**Voice, Speech and Respiration –
Coming Soon**



**Eating, Feeding and Swallowing –
Coming Soon**



Psychological Impacts

Responding to Stress and Distress in Post-COVID Patients

Practice Considerations:

- It is important for all healthcare providers to take a bio-psycho-social-spiritual approach in responding to post-COVID care needs. Patients do better when we pay attention to their physical and psychological symptoms and needs, as well as their spiritual and social needs and considerations.
- People may be stressed or distressed, and may have multiple stressors.
- Not all stressors cause distress. Supportive conversations are important to connect with people, and to understand their experience and needs.
- Broad sources of stress can include:
 - physical symptoms
 - loss of or greatly altered routines and meaningful participation
 - social needs and considerations (e.g. loss of income/finances, or relationship/role changes)
 - psychological impacts (e.g. new or re-developing mental health symptoms or illness) or concerns
 - spiritual impacts (e.g. suffering a loss of meaning and or a sense of connection) or concerns
- The pandemic environment is itself a significant stressor, and those who have had COVID-19 may also have trauma-related symptoms

Practice Tips:

- Create a safe place for patients to share and build trust and rapport
- Try to ask open ended questions in a narrative manner to find out what matters most to the client
- Approach patients in a calm, caring manner, making eye contact and speaking at a unhurried pace
- Use normalizing language
- Use familiar wording
- Use active listening skills
 - Summarizing, paraphrasing to ensure you and your client are understanding each other
- Offer practical suggestions, such as taking a few slow, deep breaths, to support patients to reduce anxiety
- Ask questions to determine if they are particular needs or area of focus, such as:

- How are things been going for you?
- Did you want to talk about it?
- Have you been finding challenges with how you are thinking or feeling?
- Since having COVID, are you having trouble making ends meet at the end of the month?
- Has a lack of transportation kept you from medical appointments or from getting medications?
- Has a lack of transportation kept you from meetings, work, or getting things needed for daily tasks (e.g., getting items needed for daily living, or transporting children to school)?
- Have you had troubles participating in your usual routines and activities?
- Recognize that the impacts of the pandemic influence all of us in various ways.
- Note the strengths of the individual, and provide patients with information to support them in self-management of stress.
- Consider referral to another healthcare provider or program if appropriate to address a given need.



Resources:

- [Help in Tough Times](#)
- [Mental Health Help Line](#)
- [Rehabilitation Advice Line](#)
- [COVID-19 Mental Health Resources](#)
- [Spiritual Practice Worksheets](#)
- [Managing Your Mood and Coping with Frustration | Your COVID Recovery](#)
- [Managing Fear and Anxiety | Your COVID Recovery](#)



Social Impacts - Coming Soon



Spiritual Impacts - Coming Soon



Resources:

Interprofessional Spiritual Health Care Resources

- How to offer Practical Compassion: [Interprofessional Spiritual Health Care Practice Wise Resources \(albertahealthservices.ca\)](#)
- Indicators of Spiritual Distress: [Symptoms of Spiritual Distress](#)
- Taking a Spiritual History: [AHS Spiritual History Tool COVID Version](#)
- Spiritual Practices to Support Resilience: [Spiritual Care Brochure](#); [Spiritual Care Practices](#)

Spiritual Health Practitioner Service Delivery

- Patient/Staff Brochure: [Spiritual Care Brochure Template](#)
- Spiritual Distress Interventions: [Spiritual Health Practitioner Interventions to Address Symptoms of Spiritual Distress: An Interprofessional Resource](#)



Nutrition

Nutrition is an important aspect of recovery, especially after a serious illness. For individuals recovering from COVID-19, certain symptoms such as fatigue, shortness of breath, loss of taste or smell, or changes in swallowing can make it difficult to eat and drink. Food security may also be an issue for as some people may be unable to return to work due to ongoing symptoms. A summary of common post-COVID-19 nutrition-related side-effects that individuals may experience are summarized in Table 1. If a patient is experiencing any of these, a referral to a registered dietitian is recommended.

Table 1. Post-COVID-19: Common-Nutrition-Related Side-Effects

Post-COVID-19: Common-Nutrition-Related Side-Effects		
• Early satiety/poor or loss of appetite	• Diarrhea	• Unintentional weight loss or gain
• Fatigue or low energy	• Constipation	• Malnutrition
• Loss of taste/taste changes	• Difficulty swallowing	• Decreased food access
• Impaired or loss of smell	• Nausea and vomiting	• Household food insecurity

As rehabilitation clinicians, it's important to be aware of the impacts COVID-19 may have on nutrition and the resources available to support patients in their recovery. The following section outlines several key nutrition resources that have been developed within AHS.

Information on Referral to a Registered Dietician:

- Health Link has registered dietitians available to answer nutrition questions. If your patient has a nutrition question about COVID-19, they can call 8-1-1 or the Rehabilitation Advice Line (1-833-379-0563), and ask to talk to a dietitian.
- To learn more about programs and services offered in each zone, visit [Nutrition Services](#). To make a referral, visit Alberta Referral Directory and search for nutrition counselling.



Resources:

- AHS Nutrition Guideline Post COVID-19: [Nutrition Guideline: Nutrition for Post-COVID-19 Recovery and Rehabilitation \(Adult\)](#)
- [COVID-19: Nutrition for Recovery](#)
- [Nutrition and Covid-19 \(albertahealthservices.ca\)](#)
- [Nutrition and COVID-19 School aged children \(albertahealthservices.ca\)](#)
- [Nutrition Education Materials | Alberta Health Services](#)



Outpatient Caseload Management & Prioritization

Prioritizing caseloads can be challenging, especially when working with post-COVID clients. The table below is intended to act as a guide for clinicians and leaders with the recognition that eligibility criteria and services vary significantly across the province. Programs may need to reflect on their criteria and service models in order to meet the needs of this unique population.

In addition to the table below, clinicians can use the **Post-COVID Rehabilitation Screening Tool** to determine the level of rehabilitation patients may require following a diagnosis of COVID-19. A copy of this screening tool is available in [Appendix B](#).

Priority Level	P1	P2	P3
Urgency	Urgent	Semi-urgent	Routine
Assessment Time Frame	Program dependent	Program dependent	Program dependent
Considerations	<ul style="list-style-type: none">• Client safety is a primary concern• Recent ICU admission• High risk for hospital re-admission• High O2 requirements (compared to baseline)	<ul style="list-style-type: none">• Recent hospital admission• Patient has not yet returned to work or school• PESE or other sequelae are prevalent• Self-management resources are insufficient	<ul style="list-style-type: none">• No identified safety issues• Ability to access other supports (i.e. RAL, AHLP education)• Are using self-management resources or supports

Appendix A:

Screening Tool for Post-COVID Physical Sequelae

IMPAIRMENT	SCREENING QUESTIONS	OUTCOME																												
<p>Post Exertional Symptom Exacerbation (PESE)</p>	<p>DePaul Symptom Questionnaire Post Exertional Malaise subscale (DSQ-PEM): <i>"For each symptom below, please circle one number for frequency and one number for severity" (complete left to right)</i></p> <table border="1" data-bbox="354 478 1258 1081"> <thead> <tr> <th data-bbox="354 478 737 772">Symptoms</th> <th data-bbox="737 478 1003 772">Frequency: Throughout the past 6 months, how often have you had this symptom? For each symptom listed below, circle a number: 0 = none of the time 1 = a little of the time 2 = about half the time 3 = most of the time 4 = all of the time</th> <th data-bbox="1003 478 1258 772">Severity: Throughout the past 6 months, how much has this symptom bothered you? For each symptom listed below, circle a number: 0 = symptom not present 1 = mild 2 = moderate 3 = severe 4 = very severe</th> </tr> </thead> <tbody> <tr> <td data-bbox="354 772 737 840">1. Dead, heavy feeling after starting to exercise</td> <td data-bbox="737 772 1003 840">0 1 2 3 4</td> <td data-bbox="1003 772 1258 840">0 1 2 3 4</td> </tr> <tr> <td data-bbox="354 840 737 907">2. Next day soreness or fatigue after non-strenuous, everyday activities</td> <td data-bbox="737 840 1003 907">0 1 2 3 4</td> <td data-bbox="1003 840 1258 907">0 1 2 3 4</td> </tr> <tr> <td data-bbox="354 907 737 974">3. Mentally tired after the slightest effort</td> <td data-bbox="737 907 1003 974">0 1 2 3 4</td> <td data-bbox="1003 907 1258 974">0 1 2 3 4</td> </tr> <tr> <td data-bbox="354 974 737 1041">4. Minimum exercise makes you physically tired</td> <td data-bbox="737 974 1003 1041">0 1 2 3 4</td> <td data-bbox="1003 974 1258 1041">0 1 2 3 4</td> </tr> <tr> <td data-bbox="354 1041 737 1081">5. Physically drained or sick after mild activity</td> <td data-bbox="737 1041 1003 1081">0 1 2 3 4</td> <td data-bbox="1003 1041 1258 1081">0 1 2 3 4</td> </tr> </tbody> </table> <p>DSQ-PEM Scoring</p> <ul style="list-style-type: none"> • Items 1–5: A frequency and severity score of \geq "2,2" on any item 1–5 is indicative of PESE • If positive for PESE, question 6-10 can be used to help guide intervention <p>Optional Questions (if positive for PESE): <i>"For each question below, choose the answer which best describes your PESE symptoms."</i></p> <table border="1" data-bbox="354 1270 1258 1648"> <tbody> <tr> <td data-bbox="354 1270 1003 1386">6. If you were to become exhausted after actively participating in extracurricular activities, sports, or outings with friends, would you recover within an hour or two after the activity ended?</td> <td data-bbox="1003 1270 1258 1386"><input type="checkbox"/> Yes <input type="checkbox"/> No</td> </tr> <tr> <td data-bbox="354 1386 1003 1453">7. Do you experience a worsening of your fatigue/energy related illness after engaging in minimal physical effort?</td> <td data-bbox="1003 1386 1258 1453"><input type="checkbox"/> Yes <input type="checkbox"/> No</td> </tr> <tr> <td data-bbox="354 1453 1003 1520">8. Do you experience a worsening of your fatigue/energy related illness after engaging in mental effort?</td> <td data-bbox="1003 1453 1258 1520"><input type="checkbox"/> Yes <input type="checkbox"/> No</td> </tr> <tr> <td data-bbox="354 1520 1003 1587">9. If you feel worse after activities, how long does this last?</td> <td data-bbox="1003 1520 1258 1587">≤1h 2-3h 4-10h 11-13h 14-23h ≥24h</td> </tr> <tr> <td data-bbox="354 1587 1003 1648">10. If you do not exercise, is it because exercise makes your symptoms worse?</td> <td data-bbox="1003 1587 1258 1648"><input type="checkbox"/> Yes <input type="checkbox"/> No</td> </tr> </tbody> </table>	Symptoms	Frequency: Throughout the past 6 months , how often have you had this symptom? For each symptom listed below, circle a number: 0 = none of the time 1 = a little of the time 2 = about half the time 3 = most of the time 4 = all of the time	Severity: Throughout the past 6 months , how much has this symptom bothered you? For each symptom listed below, circle a number: 0 = symptom not present 1 = mild 2 = moderate 3 = severe 4 = very severe	1. Dead, heavy feeling after starting to exercise	0 1 2 3 4	0 1 2 3 4	2. Next day soreness or fatigue after non-strenuous, everyday activities	0 1 2 3 4	0 1 2 3 4	3. Mentally tired after the slightest effort	0 1 2 3 4	0 1 2 3 4	4. Minimum exercise makes you physically tired	0 1 2 3 4	0 1 2 3 4	5. Physically drained or sick after mild activity	0 1 2 3 4	0 1 2 3 4	6. If you were to become exhausted after actively participating in extracurricular activities, sports, or outings with friends, would you recover within an hour or two after the activity ended?	<input type="checkbox"/> Yes <input type="checkbox"/> No	7. Do you experience a worsening of your fatigue/energy related illness after engaging in minimal physical effort?	<input type="checkbox"/> Yes <input type="checkbox"/> No	8. Do you experience a worsening of your fatigue/energy related illness after engaging in mental effort?	<input type="checkbox"/> Yes <input type="checkbox"/> No	9. If you feel worse after activities, how long does this last?	≤1h 2-3h 4-10h 11-13h 14-23h ≥24h	10. If you do not exercise, is it because exercise makes your symptoms worse?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>Positive for PESE</p> <ul style="list-style-type: none"> • Activity and/or exercise must be titrated <u>below</u> the level that symptoms are exacerbated. • Typical graded exercise (i.e. overload principal) may be detrimental • Proceed with pacing and energy conservation <p>Negative for PESE</p> <ul style="list-style-type: none"> • Proceed with graded exercise. • PESE can occur at any time. Continue to monitor symptoms and re-screen as appropriate
Symptoms	Frequency: Throughout the past 6 months , how often have you had this symptom? For each symptom listed below, circle a number: 0 = none of the time 1 = a little of the time 2 = about half the time 3 = most of the time 4 = all of the time	Severity: Throughout the past 6 months , how much has this symptom bothered you? For each symptom listed below, circle a number: 0 = symptom not present 1 = mild 2 = moderate 3 = severe 4 = very severe																												
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3. Mentally tired after the slightest effort	0 1 2 3 4	0 1 2 3 4																												
4. Minimum exercise makes you physically tired	0 1 2 3 4	0 1 2 3 4																												
5. Physically drained or sick after mild activity	0 1 2 3 4	0 1 2 3 4																												
6. If you were to become exhausted after actively participating in extracurricular activities, sports, or outings with friends, would you recover within an hour or two after the activity ended?	<input type="checkbox"/> Yes <input type="checkbox"/> No																													
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9. If you feel worse after activities, how long does this last?	≤1h 2-3h 4-10h 11-13h 14-23h ≥24h																													
10. If you do not exercise, is it because exercise makes your symptoms worse?	<input type="checkbox"/> Yes <input type="checkbox"/> No																													
<p>Cardiac Symptoms *Consider recent medical clearance, baseline status and/or pre-existing conditions when determining if patient requires further medical investigation.</p>	<p>"Since your symptoms of COVID-19"...</p> <table border="1" data-bbox="354 1690 1258 1837"> <tbody> <tr> <td data-bbox="354 1690 1003 1730">1)...can you feel your heart racing with simple activities?</td> <td data-bbox="1003 1690 1258 1730"><input type="checkbox"/> Yes <input type="checkbox"/> No</td> </tr> <tr> <td data-bbox="354 1730 1003 1770">2)...are you experiencing palpitations?"</td> <td data-bbox="1003 1730 1258 1770"><input type="checkbox"/> Yes <input type="checkbox"/> No</td> </tr> <tr> <td data-bbox="354 1770 1003 1810">3)...do you have chest pain at rest?"</td> <td data-bbox="1003 1770 1258 1810"><input type="checkbox"/> Yes <input type="checkbox"/> No</td> </tr> <tr> <td data-bbox="354 1810 1003 1837">4)...do you have chest pain with activity?"</td> <td data-bbox="1003 1810 1258 1837"><input type="checkbox"/> Yes <input type="checkbox"/> No</td> </tr> </tbody> </table>	1)...can you feel your heart racing with simple activities?	<input type="checkbox"/> Yes <input type="checkbox"/> No	2)...are you experiencing palpitations?"	<input type="checkbox"/> Yes <input type="checkbox"/> No	3)...do you have chest pain at rest?"	<input type="checkbox"/> Yes <input type="checkbox"/> No	4)...do you have chest pain with activity?"	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>If "Yes" to <u>any</u> of the 4 questions, consider referral back to primary care physician or specialist for further cardiac investigation.</p>																				
1)...can you feel your heart racing with simple activities?	<input type="checkbox"/> Yes <input type="checkbox"/> No																													
2)...are you experiencing palpitations?"	<input type="checkbox"/> Yes <input type="checkbox"/> No																													
3)...do you have chest pain at rest?"	<input type="checkbox"/> Yes <input type="checkbox"/> No																													
4)...do you have chest pain with activity?"	<input type="checkbox"/> Yes <input type="checkbox"/> No																													

IMPAIRMENT	SCREENING QUESTIONS	OUTCOME												
<p>Significant Dyspnea</p> <p>*Consider recent medical clearance, baseline status and/or pre-existing conditions when determining if patient requires further medical investigation.</p>	<p>Adapted MRC Breathlessness Scale (Complete top to bottom, if “yes” to any question proceed to the next grade.)</p> <table border="1" data-bbox="354 306 1256 613"> <thead> <tr> <th data-bbox="354 306 451 336">Grade</th> <th data-bbox="451 306 1256 336">Degree of breathlessness related to activities</th> </tr> </thead> <tbody> <tr> <td data-bbox="354 336 451 378">0</td> <td data-bbox="451 336 1256 378"><i>Are you ever troubled by breathlessness during non-strenuous activity?</i></td> </tr> <tr> <td data-bbox="354 378 451 441">1</td> <td data-bbox="451 378 1256 441"><i>Are you short of breath when hurrying on level ground or walking up a slight hill?</i></td> </tr> <tr> <td data-bbox="354 441 451 504">2</td> <td data-bbox="451 441 1256 504"><i>Do you have to walk slower than most people on level ground or do you have to stop after 15 minutes of walking at your own pace?</i></td> </tr> <tr> <td data-bbox="354 504 451 556">3</td> <td data-bbox="451 504 1256 556"><i>Do you have to stop for breath after walking about 100 yards or after a few minutes on level ground?</i></td> </tr> <tr> <td data-bbox="354 556 451 613">4</td> <td data-bbox="451 556 1256 613"><i>Are you too breathless to leave the house, or breathless when undressing?</i></td> </tr> </tbody> </table>	Grade	Degree of breathlessness related to activities	0	<i>Are you ever troubled by breathlessness during non-strenuous activity?</i>	1	<i>Are you short of breath when hurrying on level ground or walking up a slight hill?</i>	2	<i>Do you have to walk slower than most people on level ground or do you have to stop after 15 minutes of walking at your own pace?</i>	3	<i>Do you have to stop for breath after walking about 100 yards or after a few minutes on level ground?</i>	4	<i>Are you too breathless to leave the house, or breathless when undressing?</i>	<p>Score of 4: Refer back to primary care physician for further investigation (i.e. PFT, chest x-ray, etc.).</p> <p>Score of ≤ 3: Proceed with assessment for exertional oxygen desaturation.</p>
Grade	Degree of breathlessness related to activities													
0	<i>Are you ever troubled by breathlessness during non-strenuous activity?</i>													
1	<i>Are you short of breath when hurrying on level ground or walking up a slight hill?</i>													
2	<i>Do you have to walk slower than most people on level ground or do you have to stop after 15 minutes of walking at your own pace?</i>													
3	<i>Do you have to stop for breath after walking about 100 yards or after a few minutes on level ground?</i>													
4	<i>Are you too breathless to leave the house, or breathless when undressing?</i>													
<p>Exertional Oxygen Desaturation</p> <p>*Consider recent medical clearance, baseline status and/or pre-existing conditions when determining if patient requires further medical investigation.</p>	<p>To assess for exertional oxygen desaturation, the PT involved should complete one of the following tests:</p> <ul style="list-style-type: none"> • 1 Minute Sit to Stand Test • 2 Minute Step Test • 6 Minute Walk Test (6MWT) <p>Note: Oxygen saturation (SpO₂) should be monitored throughout test and for at least 1 minute post.</p> <p>Exertional Oxygen Desaturation = SpO₂ drops ≥5% <u>or</u> below 90% for patients without known lung pathology (88% for those with known lung pathology).</p>	<p>Positive Screen Refer to primary care physician for further investigation. If medically cleared continue with pacing.</p> <p>Negative Screen Exertional oxygen desaturation can occur at any time. Continue to monitor symptoms and re-screen as appropriate.</p>												
<p>Dysautonomia</p> <p>*Consider recent medical clearance, baseline status and/or pre-existing conditions when determining if patient requires further medical investigation.</p>	<p>“Since your symptoms of COVID-19”...</p> <p>1)...do you feel lightheaded after you change position? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>2)...do you feel unwell when sitting upright or standing? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If “Yes” to <u>either</u> question, complete the Active Stand Test to screen for orthostatic hypotension (OH) or postural orthostatic tachycardia syndrome (POTS).</p> <p>During the Active Stand Test, blood pressure (BP) and heart rate (HR) should be measured after 5 minutes in supine, the immediately upon standing and at 2, 5 and 10 minutes.</p> <ul style="list-style-type: none"> • Orthostatic hypotension (OH) = A fall in systolic blood pressure (SBP) of >20mm Hg or diastolic blood pressure (DBP) > 10 mm Hg from baseline. • Postural orthostatic tachycardia syndrome (POTS) = Sustained elevation of HR ≥ 30 bpm from baseline or ≥ 120 bpm, in the first 10 minutes of being in an upright position. 	<p>If patient screens positive for OH, provide education and proceed with symptom titrated activity and exercise.</p> <p>If patient screens positive for POTS, refer back to primary care physician for further investigation.</p>												

Colter, J., Holtzman, C., Dudun, C., & Jason, L. A. (2018). A brief questionnaire to assess post-exertional malaise. *Diagnostics*, 8(3): 66. [10.3390/diagnostics8030066](https://doi.org/10.3390/diagnostics8030066). Adapted with permission.

Medical Research Council. 1959 MRC Breathlessness Scale. 1959. Available from: <https://mrc.ukri.org/documents/doc/1959-mrc-breathlessness-scale/>. Used with the permission of the Medical Research Council. Adapted with permission.



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Appendix B:

Post COVID Rehabilitation Screening Tool

Sample Script: The purpose of this screening tool is to evaluate any functional concerns or lingering symptoms you may be experiencing as a result of COVID-19. This will help us determine what rehabilitation supports you may require moving forward.

This survey will take 5-10 minutes to complete. If there are topics you do not wish to comment on or if you are not currently experiencing issues in an area, please indicate N/A. The first part of the survey will focus on your functional abilities and the second part of the survey will look at the symptoms you are currently experiencing.

Considerations for Completion:

- The purpose of this screening tool is to identify rehabilitation needs of patients who have been diagnosed or were suspected to have COVID-19.
- This tool can be administered at any time during the patient's journey but it is important to consider the natural progression of the illness when determining rehabilitation needs. Depending on the severity of symptoms & functional impairment, some clients may be better served by starting with a self-management program before being referred to more specialized rehabilitation.
- This tool can be completed by any health care provider (e.g. nursing / allied health / physician)

Scoring/Evaluation:

Rehabilitation needs should be determined using a combination of the PCFS scale and the symptom checklist. The following is meant to act as a guide but as always, clinicians are encouraged to use their clinical judgement when directing patients to rehabilitation services.

PCFS Grade 0 to 1 (mild functional impairment):

- Consider **universal** rehabilitation interventions (i.e. self-management resources)
- Universal rehabilitation = Services available to all Albertans.

PCFS Grade 2 to 3 (moderate functional impairment):

- Consider **targeted** rehabilitation interventions (i.e. group programming)
- Targeted rehabilitation = Services designed for groups of people with a common need.

PCFS Grade 3 or 4 (severe functional impairment):

- Consider **personalized** rehabilitation interventions (i.e. individualized, multidisciplinary care)
- Personalized rehabilitation = Services designed to meet the unique needs of an individual.

Part 1: Post-Covid-19 Functional Status Scale (PC)

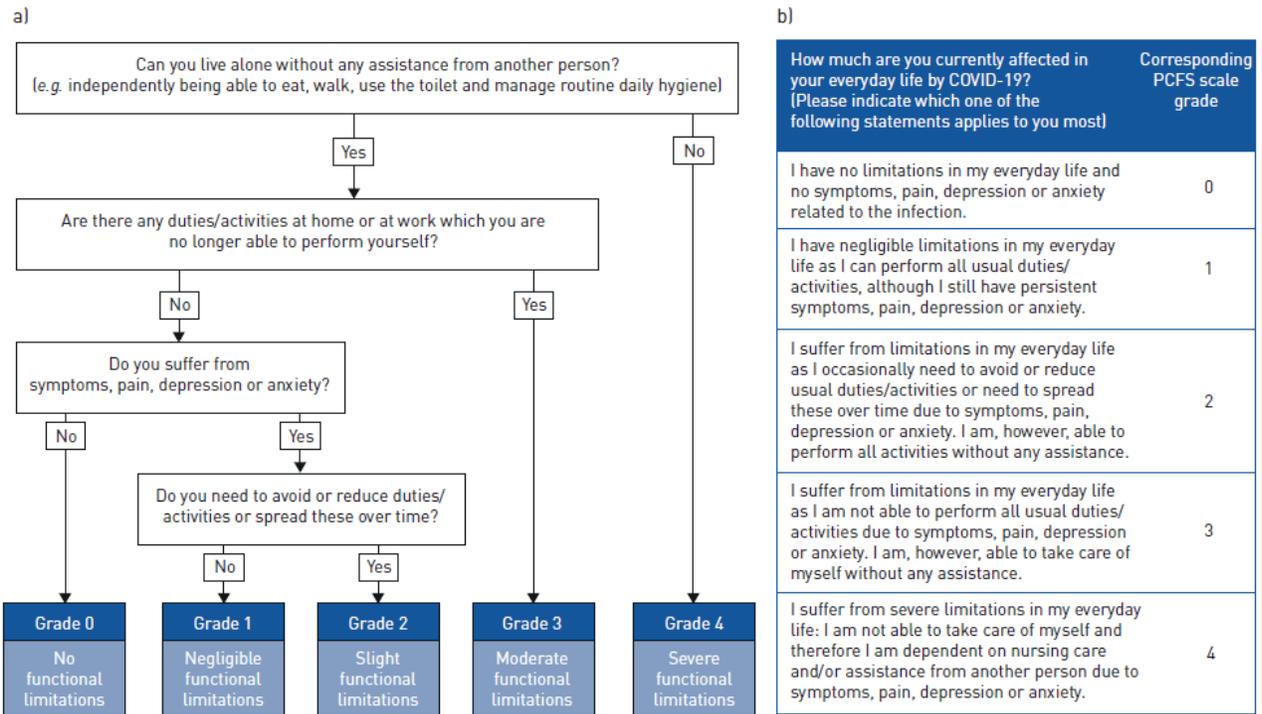


FIGURE 1 Patient self-report methods for the Post-COVID-19 Functional Status (PCFS) scale. a) Flowchart. b) Patient questionnaire. Instructions for use: 1) to assess recovery after the SARS-CoV-2 infection, this PCFS scale covers the entire range of functional limitations, including changes in lifestyle, sports and social activities; 2) assignment of a PCFS scale grade concerns the average situation of the past week (exception: when assessed at discharge, it concerns the situation of the day of discharge); 3) symptoms include (but are not limited to) dyspnoea, pain, fatigue, muscle weakness, memory loss, depression and anxiety; 4) in case two grades seem to be appropriate, always choose the highest grade with the most limitations; 5) measuring functional status before the infection is optional; 6) alternatively to this flowchart and patient questionnaire, an extensive structured interview is available. The full manual for patients and physicians or study personnel is available from <https://osf.io/qgpdv/> [free of charge].



Part 2: Post COVID Symptom Checklist

Sample Script: The next part of the survey we will be discussing any symptoms you are currently experiencing as a result of COVID-19. The symptoms are divided into categories which will help us determine how to best direct your recovery. If you have no symptoms in a category, please indicate N/A and we will move on to the next section. If you are unsure, we will ask more detailed questions. For each question, please indicate if your symptoms are worse, the same or better than before your illness.

Cardiorespiratory Symptoms? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> Unsure		Neurological Symptoms? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> Unsure	
Shortness of breath at rest? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Difficulty controlling the movement of your body? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better
Shortness of breath with activity? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Difficulty eating, drinking or swallowing (i.e. choking)? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better
Lingering cough or noisy breathing? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Difficulty controlling your: Bowels? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better
Chest pain at rest? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Bladder? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better
Chest pain with activity? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Issues with concentration, thinking or memory? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better
Dizziness, fainting or loss of consciousness? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Difficulty hearing? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better
		Difficulty seeing? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better
Musculoskeletal Symptoms? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> Unsure		Other Symptoms? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> Unsure	
Generalized muscle weakness? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Extreme fatigue/exhaustion? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better
Muscle or joint pain? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Worse after physical or mental activity?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Difficulty walking? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Have you lost your taste or sense of smell?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Difficulty doing own washing & dressing? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Have you been eating less than usual for more than 1 week?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Difficulty doing your usual activities (i.e. leisure or work)? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Have you lost or gained a significant amount of weight without trying?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Lost <input type="checkbox"/> Gained
Mood Related Symptoms? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> Unsure		Issues with pain or discomfort? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better
Experiencing anxiety? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Difficulty sleeping? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better
Experiencing depression? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better	Headaches? <input type="checkbox"/> N/A	<input type="checkbox"/> Worse <input type="checkbox"/> Same <input type="checkbox"/> Better

* Upon completion, providers should ask clients about additional symptoms that may have been missed.



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