Rehabilitation & Allied Health Practice Considerations

Post - COVID-19

Version 3

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Contributors

Thank you to our contributors from across Alberta, Canada and overseas. Clinical experts including Speech Language Pathologists, Physiotherapists, Occupational Therapists, Registered Dieticians, Psychologists, Social Workers, Recreation Therapists, Spiritual Health Practitioners, Researchers, Physicians, Specialists and Patient Advisors gathered to advise, advance insights, ensure alignment and develop the content and recommendations necessary to provide safe, effective, and quality patient care.

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 of all ages 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.

The purpose of this document is not to outline all treatment approaches, rather it is intended to highlight **new** practice considerations when working with patient's 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 experiencing ongoing 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.

A variety of terms to describe symptoms after COVID-19 have emerged, including Long COVID, Post COVID Condition, Persistent Post COVID and more. It is important to clarify the terminology for the purposes of rehabilitation and recovery. Vu and McGill (2021) used the term post-COVID-19 condition to incorporate symptoms beyond the acute infection phase. The NICE rapid guideline (2022) in the UK describes two conditions: ongoing symptomatic COVID-19 with symptoms between 4-12 weeks after infection, and Post COVID-19 syndrome with symptoms present 12 weeks after illness and lasting at least 2 months. The World Health Organization (October 2021) developed a clinical case definition of Post COVID-19 through a Delphi consensus, this definition reflects the long term symptoms typically associated with what has been termed Long COVID.

> "*Post COVID-19 condition occurs in individuals with a history of probable or confirmed SARS-CoV-2 infection, usually 3 months from the onset of COVID-19 with symptoms that last for at least 2 months and cannot be explained by an alternative diagnosis. Common symptoms include fatigue, shortness of breath, cognitive dysfunction but also others (see Table 3 and Annex 2) which generally have an impact on everyday functioning. Symptoms may be new onset, following initial recovery from an acute COVID19 episode, or persist from the initial illness. Symptoms may also fluctuate or relapse over time. A separate definition may be applicable for children*." (Page 1 World Health Organization, 2021)

Recognizing that definitions and terminology continue to evolve, for the purpose of this document, the term "**Post-COVID"** is used to capture patients in the sub-acute phase of recovery including patients who required an acute care or intensive care admission **and** patients experiencing Long COVID or Post COVID-19 conditions.

Rehabilitation and allied health professionals provide a variety of roles across the continuum of care. One important role is to help patients improve their activity tolerance and function while providing education and resources to support self-management over the longer term. Another key role is to address other long-term impacts including psychological needs, social needs, spiritual well-being, and community re-engagement.

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

1) Post-exertional symptom exacerbation
2) Cardiac symptoms

3) History of Multisystem Inflammatory Syndrome in Children (MIS-C)
4) Significant dyspnea
5) Exertional oxygen desaturation
6) Dysautonomia and orthostatic intolerance
7) Coagulation dysfunction

The guidelines in this document address the physical sequelae mentioned above as well as treatment recommendations for other post-COVID sequelae including cognitive changes, speech & language impairments, social, psychological, and spiritual impacts. Clinicians are encouraged to use validated, psychosocial screening tools that are organizationally approved such as the social determinants of health module in Connect Care.

The recommendations are based on current evidence (as of June 2022), published expert opinions and consensus statements. 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.

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Supporting Self-Management

Self-management and partnership with patients and families is essential to optimizing health outcomes for those recovering from symptoms of COVID-19. Patients and families often require support to improve their confidence, knowledge and skills to manage the physical, social and emotional impacts associated with the presenting symptoms. Patients and families may also require validation of their concerns with reassurance that their experience is real.

Communication Tips

- **Use Patient-Centered Communication Strategies:** Communication is a key tool in any interaction between a healthcare professional and patients/families and has been shown to improve patient satisfaction, patient knowledge comprehension, treatment adherence, and health outcomes (King, 2013). Managing cases of Long Covid is no different in this respect and thus, reviewing patient-centred communication best practices may be helpful in bolstering communication skills and improving your understanding how communication may help improve outcomes, the role communication plays in healthcare interactions and identify skills which may help you enhance your approach to patient-centered communication. Although written specifically about patient-physician communication, the 2013 'Best Practice' for Patient-Centered Communication narrative review published in the Journal of Graduate Medical Education provides an excellent overview of patient-centred communication which is applicable across healthcare professions and covering each of the topics noted above (King, 2013).

- **Feel comfortable in being certain about uncertainty:** Within medicine, there is a great deal of uncertainty in which healthcare professionals must navigate (Smith et al., 2013). Given Long Covid is a new condition, a great deal of uncertainty remains as definitions lack expert consensus, and etiological understandings are not fully understood (Mehandru et al., 2022). Since uncertainty surrounding a medical diagnosis can be distressing to patient, families and healthcare professionals, Smith et al. (2013) provide a 3-task framework to help clinicians navigate acknowledging and communicating about uncertainty with patients.

    - **Task 1:** "*Normalize the uncertainty in prognosis*". It is important to acknowledge the limitations to medical knowledge and diagnostic investigations. Although we would like to be able to provide more certainty on what may cause a given symptom or provide more certainty that a treatment will result in the desired outcome – in almost all cases total certainty is not possible. Normalizing that having uncertainty is a

normal part of illness, while also acknowledging that there is more uncertainty about Long Covid than other conditions (because it is new, less researched, does not have a diagnostic test to confirm the diagnosis, etc.) may be helpful when paired with the other two tasks of this framework. Take care to not dismiss the importance and emotional impact of this uncertainty with patients.

- **Task 2:** "*Address [the] patients' [and familys'] emotions about uncertainty, acknowledging how difficult it may be for them not to know*." Some patients and family may become focused upon seeking answers to the uncertainty. To a degree, this seeking knowledge to alleviate uncertainty is a normal and helpful behaviour. However, if the distress, emotional intensity, or focus on seeking answers becomes barriers to engaging in treatment, the patient or family may need to revisit their physician to discuss (A) the steps that were taken to arrive at the diagnosis; and/or (B) to explore their current mental health and coping.
    - Be cautious in the use of statements of reassurance, such was "the doctors have ruled out everything bad" because in the face of uncertainty, many such statements may be perceived as dismissive of their experiences and the impact Long Covid may be having on their lives and functioning. Instead, focus on statements of validation: "It makes sense to me how you could be feeling ____ given ____ happening" and helping the patient to identify actions within their control (such as engaging in treatment) which may help achieve what they want for the future. This is where practices such collaborative goal setting may be helpful.

- **Task 3:** "*Help patients and families manage the effect of uncertainty on their ability to live in the here and now*." An effective way to manage uncertainty regarding what the future (in relation to one's health and quality of life), is to focus on the current moment. Allied staff have a critical role to play in this, as many of the therapies or symptom treatment options outlined in this document help to address the symptoms which may be causing the greatest disturbance in the patient's usual functioning. Again, this is where the use of goal setting, pacing and encouraging self-management strategies may be helpful.

Tips for Supporting Self-Management:

- Begin any program with the clinician explaining their role and allow time for the patient and family to introduce themselves and state what they are hoping to gain from the service or program.

- Acknowledge and validate the patient and family's concerns.

- Utilize active listening skills to identify knowledge gaps by finding out what the patient and family knows, expects and has tried.

- Consider the individual goals of the patient and family and tailor education and treatment as needed.

- Consider the learning needs of partners, such as employers, educators, coaches etc.

- Consider involving patients in group programming so they can learn from other patients with similar issues or concerns.

- Support the patient and family in navigating the health care system by making them aware of the resources available.

    - All Patients should be directed to the AHS Getting Healthy after COVID-19 website: COVID-19 Getting Healthy after COVID-19 | Alberta Health Services

    - 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)

- Provide information about other community supports and programs that may be available to assist the patient in their recovery.

Resources:

- AHS Primary Health Care Resource Centre Self-Management: Self-Management | Alberta Health Services
- AHS Better Choices, Better Health®: Better Choices, Better Health | Alberta Health Services
- World Health Organization - Support for rehabilitation: self-management after COVID-19-related illness (Second Edition)

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 episode of care.

This section focuses on screening for physical symptoms. It is important 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. It is also important to note that children often cannot describe or explain their symptoms; they will require families and clinicians to watch for and monitor trends in participation and behavior. Clinicians should also consider how recovery from COVID affects a patient's wellbeing, for this reason clinicians may wish to work with their teams to screen for psychosocial needs.

Screening

To support clinicians in screening patients for common red flag symptoms, screening tools for post-COVID physical sequelae have been developed for adult and pediatric populations. These tools are separate from the Post Covid Functional Screen and Symptom Check List which is a general screening tool for Post Covid needs (Appendix A) and is often used in by service providers as part of their referral triage process.

These tools incorporate outcome measures that can be used to screen and assess patients for post-exertional symptom exacerbation, cardiac symptoms, significant dyspnea, exertional oxygen desaturation and dysautonomia. These tools are 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 B for the Adult Screening Tool for Post-COVID Physical Sequelae
See Appendix C for the Pediatric 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 or direct patients to the appropriate next level of care.

Red Flags

- **Post Exertional Symptom Exacerbation (PESE)**
    - If a patient 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 (Appendix B and Appendix C).
    - 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 pathology**
    - The management of myocarditis or cardiac pathology 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.
    - Increasing chest pain that is worsening – Urgent care

- **History of Multisystem Inflammatory Syndrome in Children (MIS-C)** - new
    - Clinicians should be aware of MIS-C history and associated implications including decreased exercise capacity and cardiovascular risk See Alberta Health Services MIS-C Care Guide for more information. Treatment decisions should be based on recommendations from the patient's physician, and ongoing medical follow-up is typically warranted.

- **Unexplained chest pain or tightness or increasing/worsening chest pain**
    - 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).

- **Alternate cardiac presentations in children.** Chest pain is not always associated with cardiac disease in children (Geggel, 2004). Children should be monitored for alternative symptoms that may indicate cardiac presentations:

    - Increased respiratory rate
    - Central or peripheral cyanosis
    - Nausea and vomiting
    - Leg pain

- **Significant Dyspnea**

    - Patients who have shortness of breath at rest or during speaking, or those who score **4** on the modified MRC breathlessness scale should be referred to primary care for further investigation (i.e. upper airway assessment, pulmonary function testing, cardiac assessment).
    - Children who are breathless after mild activity/play and do not recover within 4 minutes
    - Patients who score **≤3** on the modified MRC breathlessness scale should be further assessed for exertional oxygen desaturation.
    - See the Screening Tool for Post-COVID Physical Sequelae (Appendix B and Appendix C) for details on the modified 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.
    - For adult patients during mild exertion, a fall in oxygen saturation of ≥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). These values are slightly different from the Alberta Primary Pathway and reflect the rehabilitation context of mild exertion.
    - For pediatric patients during mild exertion a fall in oxygen saturation below 92% is considered abnormal (Langley & Cunningham, 2017).
    - 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.

- During pregnancy, a saturation below 95% should be directed to urgent care.
- See the Respiratory Symptoms section for additional information.

☐ **Postural Orthostatic Tachycardia Syndrome (POTS)**

- Sustained elevation of HR ≥30 bpm (adults) or ≥40 bpm (children) from baseline or ≥120bpm, 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.

☐ **Coagulation Dysfunction**

- Breathlessness plus leg/calf pain
- Signs and symptoms of stroke
- Signs and symptoms of DVT

Yellow Flags

☐ **Elevated heart rate**

- Heart rate (HR) may increase quickly due to significant deconditioning following prolonged illness and/or hospitalization. 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 >20mm Hg or DBP >10 mm Hg from baseline within 3 minutes in an upright position for adults or 4 minutes for children.

- If symptoms of OH are extremely limiting, consider referral back to the primary care physician for pharmacological management.

Resources:

- Rehabilitation for Clients with Post COVID-19 Condition (Long COVID), Canadian Physiotherapy Association
- If patients 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 patient's recovery from COVID-19 (Appendix B). A pediatric version has been adapted with permission but has not yet been validated (Appendix C)

- ☐ **Red Flag: Post Exertional Symptom Exacerbation**
  - If a patient 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. (Appendix B and Appendix C)
  - 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 and family education regarding activity pacing and energy conservation. See the Maximizing Energy section for more detailed information on pacing.

- ☐ 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.

- Cognitive and emotional load may contribute to symptom burden or exercise intolerance. Consider the patient's day to day needs including work or school when scheduling or planning rehabilitation appointments.

- 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, academic or leisure activities. A multidisciplinary approach to the patient'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 families and to 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 patients to lay down when needed).

- For adult patients 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 – age) x 0.55 = 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.

- For adult and pediatric patients begin activity and exercise at or below a score of 2 on the BORG and only progress above a BORG of 2 if symptoms do not recur (symptom titrated exercise).

- 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)
  - A Rating of perceived exertion using facial expressions for conveying exercise intensity for children and young adults (Chen et al., 2017).

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)
- 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, tachycardia, myocardial injury and heart failure are commonly reported (Pellicori et al, 2021; Ståhlberg 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 pathology**
  - The management of myocarditis or cardiac pathology 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: History of Multisystem Inflammatory Syndrome in Children (MIS-C)** - new
  - Clinicians should be aware of MIS-C history and associated implications including decreased exercise capacity and cardiovascular risk See Alberta Health Services MIS-C Care Guide for more information. Treatment decisions should be based on recommendations from the patient's physician, and ongoing medical follow-up is typically warranted.

- **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).

- **Red Flag: Alternate cardiac presentations in children**

- Increased respiratory rate
- Central or peripheral cyanosis – attach norms for resp rate by age. In children respiratory arrest precedes a cardiac arrest –
- Nausea and vomiting
- Leg pain

- **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 and families 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 – age) x 0.55 = 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.

- For pediatric patients follow recommendations from the cardiologist.

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 modified MRC breathlessness scale should be referred to primary care for further investigation (i.e. upper airway assessment, pulmonary function testing, cardiac assessment).
  - Children who are breathless after mild activity/play and do not recover within 4 minutes
  - Patients who score **≤3** on the modified MRC breathlessness scale should be further assessed for exertional oxygen desaturation.
  - See the Screening Tool for Post-COVID Physical Sequelae for details on the modified MRC breathlessness scale (Appendix B and Appendix C)

- **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.
  - For adult patients during mild exertion, a fall in oxygen saturation of ≥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). These values are slightly different from the Alberta Primary Pathway and reflect the rehabilitation context of mild exertion.
    - For pediatric patients during mild exertion a fall in oxygen saturation below 92% is considered abnormal (Langley & Cunningham, 2017).
    - 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.

- **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.

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).

    - **Nasal Breathing:**
        - Put one hand on your chest and the other on your belly.
        - Draw air in slowly through your nose; jaw and face can be relaxed
        - Exhale slowly through your nose
        - 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 inhale and exhale for a set of counts (i.e. 4 counts in, 4 counts out; 6 counts in, 6 counts out)
        - This can also be performed as Box Breathing: inhale, hold, exhale, hold

- 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. Regardless of which assessment tool used once desaturation is observed the test should be terminated to limit over exertion.

- Patients should be advised to terminate any test if they develop adverse symptoms (i.e. severe breathlessness, chest pain or dizziness).

- In adult 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, patients should be monitored for at least 1 minute following completion of the test to observe for exertional oxygen desaturation (Núñez-Cortés et al., 2021).

- 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).

- In pediatric patients the 6 minute walk test is recommended for children 5 years and up. Note differences in distances walked are age dependent (Ulrich et al., 2013).

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 at., 2020). Patients and families can be educated on home pulse oximetry to support activity progression, safety, and self-management.

- 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 and families 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 and families to online self-management resources: After COVID-19: Information and resources to help you recover (alberta.ca)

    - Patients with normal pulmonary function testing may experience chronic cough. These patients may benefit from a referral to or resources from a chronic cough specialist or clinic: Chronic Cough | Cumming School of Medicine | University of Calgary (ucalgary.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)
  - A Rating of perceived exertion using facial expressions for conveying exercise intensity for children and young adults (Chen et al., 2017).

- 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 (Adults)
  - 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 (Adults)
  - 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)

- 6 Minute Walk Test (Pediatrics and Adults)
  - Sub-maximal exercise test used to assess aerobic capacity.
    Six Minute Walk Test / 6 Minute Walk Test - Physiopedia (physio-pedia.com)

Resources:

- AHS Patient Education Resource: Symptoms: Coughing (alberta.ca)
- COPD: Learning to Breathe Easier COPD: Learning to Breathe Easier (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)
- Chronic Cough Resources: Chronic Cough | Cumming School of Medicine | University of Calgary (ucalgary.ca)

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 responds to the challenges imposed by upright positioning (Brignole, 2007). OI symptoms can include lightheadedness, palpitations, tremulousness, and atypical chest pain (Raj et al., 2020). 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 (Lahrmann 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 (adults) or ≥40 bpm (children) or ≥120bpm, in the first 10 minutes of being in an upright position, without classical orthostatic hypotension associated and accompanied by orthostatic intolerance. Other symptoms such as dizziness, weakness, presyncope and heart palpitations are also common (Rocha et al., 2021). Orthostatic tachycardia can also present in the absence of orthostatic symptoms, which if accompanied by palpitations should be referred back to primary care (Ståhlberg 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 (adults) or ≥40 bpm (children) from baseline or ≥120bpm, in the first 10 minutes of being in an upright position accompanied by orthostatic symptoms.
  - 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 >20mm 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 patients 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). This may or may not progress into an upright position.

- 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 (Putrino et al., 2021). Note that the classic Levine protocol may be too intense. It is recommended to start at or below a BORG of 2 before progressing to use heart rate determine progression (Putrino et al., 2021).

- Dysautonomia has also been shown to impact a patient’s cognitive function see cognitive section for treatment considerations.

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)

Resources:

- Patient information: Learning About Postural Orthostatic Tachycardia Syndrome (POTS)
- NHS POTS information: Postural tachycardia syndrome (PoTS) - NHS (www.nhs.uk)
- UK website with patient resources: PoTS - Postural Tachycardia Syndrome (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
- Calgary Autonomic Investigation & Management Lab: Postural Tachycardia Syndrome Non Pharmacological Treatment Recommendations
- Canadian Cardiovascular Society: POTS Position Statement
- Dysautonomia International - Dysautonomia International: Dysautonomia Awareness, Dysautonomia Advocacy, Dysautonomia Advancement
- The Mt Sinai Recovery Plan for Long Covid | With Dr David Putrino - YouTube

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 patients after COVID-19 (Wang et al., 2020).

- **Red Flag: Post-Infectious inflammatory arthritis**
    - Joint swelling, reduced range of motion, morning stiffness greater than 1 hour.

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.
- Patients 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)

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 and 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 and families 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.
- Both 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 and families 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
- Rehabilitation for Clients with Post COVID-19 Condition (Long COVID): Guidance for Canadian Rehabilitation and Exercise Professionals: Long COVID Guidance for Canadian Rehabilitation and Exercise Professionals
- Graduated return to play guidance for performance athletes: Suggested-Grad-RTP-Progression-Parents.pdf (umich.edu)

Fatigue Management & Maximizing Energy: Returning to Daily Activities and Meaningful Occupations

Fatigue is common in those recovering from COVID-19 and can be one of the most debilitating and long lasting symptoms (Longue et al., 2021). It is defined as "*a feeling of weariness, tiredness or lack or energy. It can be physical, cognitive, or emotional, mild to severe, intermittent to persistent, and impact a person's energy, motivation and concentration.*" (Herrera et al., 2021, p. 5). These symptoms can fluctuate and while they typically slowly improve over time, additional interventions should be considered if the condition lasts longer than four weeks, is severe, or is negatively impacting an individual's quality of life and ability to participate in meaningful activities or occupations. (Herrera et al., 2021) All patients can benefit from self-management strategies such as the "Stop, Rest, Pace" and consider referring those with persistent fatigue to an Occupation Therapist to support patients return to activities and meaningful occupations.

Herrera, et al. (p. 8) state common descriptors of fatigue in those recovering from COVID-19 include:

- *Severe exhaustion after minimal physical or mental exertion*
- *The sense of being weighed down all day*
- *After having a 'good day' of increased activity level, the feeling of 'crashing' requiring several days recovery*
- *Persistent tiredness or exhaustion after sleep/upon waking*

Post-COVID fatigue may be multifactorial and influenced by sleep, nutrition, drug reactions, mood- anxiety/ depression, changes in routine, autoimmune, cardiac, respiratory, or endocrine disorders. These conditions should be addressed concurrently as part of a fatigue management plan. According to Herrara, et al. (2021), the definitions of fatigue used in the Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) Clinical guideline (2007) can also be applied to Post-COVID fatigue:

- *Mild Fatigue*: independent with mobility, ADLs, and light housework (with difficulty); May be able to return to work/school but not participate in other, non-essential activities; May require modifications to daily routines or schedules.
- *Moderate Fatigue*: Decreased community mobility and Instrumental Activities of Daily Living (IADL); generally stop work/school and require frequent rest periods or naps.
- *Severe Fatigue*: Decreased Basic Activities of Daily Living (BADL) and mobility; mostly confined to home – leaving home may lead to prolonged after effects.

Traditionally, fatigue management strategies have used the term *energy conservation*. Recently, however, the term *energy maximization* is being adopted as it emphasizes a strength-based, positive approach and better aligns with patient's goals. Patients have expressed they do not want to 'save or conserve' their energy but strive to utilize energy as efficiently as possible in order to participate in the activities or occupations that are most important to them. Using energy maximization strategies can help patients to avoid Post-Exertional Symptom Exacerbation (PESE)/Post-Exertional Malaise (PEM).

Red Flags

Significant Dyspnea

- See the Screening Tool for Post-COVID Physical Sequelae for details on the modified MRC breathlessness scale.
- See the Respiratory Symptoms section for additional treatment recommendations for dyspnea.

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 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.

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.

Treatment Considerations:

Principles and strategies for Energy Maximization

Acknowledge and validate the patient's experience. Most COVID 19 patients anticipated a short–term illness and are coming to terms with making lifestyle adjustments to manage their recovery. Patients can experience anxiety, shame and frustration resulting from the experiencing a prolonged recovery and an inability to return to their usual routine.

Collaborative goal setting conversations can be the first step in identifying patient-centered goals and priorities for allocating and maximizing energy. Once goals have been established, tracking current activities and energy levels (and other post exertional symptoms) can be a valuable tool to understand energy utilization patterns and occupational participation. Symptom tracking including Rate of Perceived Exertion or Activity and Symptom trackers can support the patient to develop an understanding of their current energy budget. Support patients to develop an awareness of their energy "budget" and the cost associated with their individual PESE triggers. Ensure your patients have considered not just the cost of physical tasks but also emotional and cognitive energy outputs.

Energy Budget explained:

"Just like with money it is important to know how much energy you have so you don't over spend and go into overdraft (PESE is like overdraft - you pay high interest when you take out more than you have). All activities require energy. Developing an understanding of your current energy budget and the cost of individual activities can help you plan to spend wisely and avoid PESE. You can make deposits to your account thru restorative activities like quality rest, deep breathing and relaxation.

Educate patients and families about the "Push and Crash" or "Boom and Bust" cycle and that there is often a causational relation to PESE/PEM. It is important to note that there can be a delay in experiencing a "crash" of 12- 72 hours. Normalize patients' non-linear recovery experience and emphasize that progression of activity level should be based on avoidance of symptom exacerbation. Reinforce that energy maximization strategies like pacing, are ways to avoid PESE and offers a way to reduce symptoms, regain control, and support improvement. It is important for patients and families to understand that participating in cognitively, emotionally, or spiritually demanding activities also requires energy and that thoughts and emotions can be a barrier to successful implementation of energy maximization techniques*. A discussion of barriers to implementation can be integral to success.*

The Six P's of Energy Maximization

1. Pacing with precaution – Help patients identify their energy budget and problem solve around how they will pace themselves to stay within this budget. Breaking up activities and proactively building in frequent rest breaks are important features of pacing.
2. Positioning – Modify activities so they are more energy efficient. This can include the use of gadgets/aids and equipment as well as your body position during activities. Aids such as bathing or mobility aids may be useful in maximizing energy.
3. Planning – Using a journal/planner/agenda can assist with planning tasks on a daily or weekly basis as well as help reflection on energy reserves to avoid over exertion. Encourage development of sustainable routines with **rest** as the foundation and include activities that restore energy or rejuvenate the patient.

4. Prioritizing- Identify priorities for the day/ week; 'what matters most to you'. Help the patient consider which activities they must complete themselves and which could be delegated.
5. Problem solving – Look for new and energy efficient ways to engage in activities. Recognizing and celebrate successes.
6. Permission - Encourage the patient to give themselves permission to do things differently than before COVID. It is important to be patient with yourself and acknowledge recovery can take time. Self – compassion skills can support this.

Rules for rest

- Rest *before* you are fatigued. If you rest when you start to get tired rather than after you are exhausted you will require less recovery time.
- Take short, frequent rests. They can add up to less overall rest time. Experiment with timing and length of rest.
- Plan rest into your schedule first, then schedule activities around rest. Think of rest as an activity and plan it into your day.
- Make rest a habit. To use budgeting terms, resting is making a deposit into your energy bank account.

KEY MESSAGES:

- Guided discussions including activity analysis can support patients to incorporate the 6 P's at the task/day/week levels.
- Increasing or adding new activities is not based solely on target dates but on the absence of PESE.
- Support the development of new routines with an emphasis on pacing and avoidance of push/ crash cycles.
- A key feature of maximizing energy is rest and restoration

Progressing Activities

Develop a patient-centered, symptom-guided rehabilitation program with short and long term goals where progressions are **not based on timelines** but are titrated based on the avoidance of symptom exacerbation. In order to break the Push/Crash Cycle, patients must develop new activity patterns by:

1. Recognizing individual symptoms of fatigue (PESE) and triggers.
2. Finding a current activity budget (activity levels that do not result in PESE)
3. Adapting activity budgets (learning to work within your budget)
4. Expanding limits based base on absence of symptom exacerbation

SPECIAL AREAS FOR CONSIDERATION:

Return to Work (RTW) or return to school for children, youth and young adults.

In an online survey of 3762 individuals whose illness lasted over 28 days, Davis et al (2021) found **45.2%** required a reduced work schedule compared to pre-illness and an additional **22.3%** were not working at all due to illness. By seven months, many patients had not yet recovered (mainly from systemic and neurological/cognitive symptoms) and had not returned to previous levels of work.

> When possible, work with employers/ insurance companies to find solutions together. It is important to keep the employers needs and the job demands in mind when developing a RTW plan. According to the Supreme Court of Canada, "an employer has a legal duty to take reasonable steps, in policies or conditions of work, to accommodate an employee's individual needs," this is call duty to accommodate. "However, this legal duty does not apply if the only way to resolve the problem will cause the employer undue hardship." *Alberta Human Rights Commission.*

Determining readiness

A successful return the work plan needs to be sustainable. Before looking at returning to work, it is important to consider if patients are managing home life within their energy budget. Managing home life can be characterized by the ability to minimize push/crash cycles while engage in most home life activities. Patients still need to be able to prepare meals, do laundry, shower and commute to work in addition to doing their paid occupation. Having a plan to mitigate the home life energy demands through the use of strategies such as delegation may allow for return to work despite not yet returning to full home life activities. This will depend on the patient's priorities. Consider having your patient begin progressively practicing return to work activities like waking up closer to their work hours and simulating job duties. Making a plan to reduce the anxiety of RTW is also important, as this can be a trigger for PESE.

Activity/ symptom logs can help determine if current activity levels are supportive of RTW. Ability to engage in cognitive, physical, and emotional activities without frequent and prolonged PESE as well as adequate sleep schedules are factors that support return to work. Once it is determined that there is a manageable home life plan, engaging in a *job duty activity analysis* can support making recommendations for appropriate accommodations (if needed) and return to work schedule. Job duty analysis can include developing a list the job demands (duties/ tasks) and identifying physical, cognitive and emotional PESE triggers. Once barriers/ challenges as well as strengths for return to work are identified, engage with patient (and employer as appropriate) to problem solve through these barriers and enhance strengths.

Return to work plans should be individualized and based on clinical judgement. Consider if aids, adaptation or work duty/ hours are required. Depending on the patient's needs, adaptations and aids could include ergonomic work environments, computer accessibility features, assistive devices and technology, mental wellness supports, a place to take rest break. Pacing and rest breaks are a key features in managing fatigue so accommodations in length of work day / days of work, frequency/ length of breaks can be supportive. If patients are

using energy maximization strategies in their daily lives, they may find it useful to apply similar strategies in the work place. It is also important to consider that managing an illness takes energy and should be built this into RTW plan. Medical appointments should ideally be consider part of the work day. During the patient's first few weeks returning to work, it can be supportive to reduce the home life work load by delegating, planning ahead and prioritizing.

Progressive return to work planning

People with Post COVID may require a more gradual RTW plan when compared to a musculoskeletal injury population. Progression should not be based on timelines but on ability to manage/ avoid PESE. If timelines are required, it is can be helpful to build an option in the plan to re-adjust timelines if progressions are not manageable. Avoid progressing more than one variable at a time (example: hours of work, days of work, duties). Working from home can reduce the energy demands of commuting.

Sex and Intimacy

Post COVID patients have expressed barriers to sex/intimacy including fatigue, brain fog, erectile dysfunction and irregular periods. Open communication between partners is essential to support sexual wellness when recovering from Post-COVID. Communication can support shared problem solving and combats the tendency to isolate. Consider applying the 6 P's to sex/ intimacy. Planning intimacy for a time of day when ones energy is best, is a supportive strategy. As well, consider positions that are energy efficient. Pacing can be supportive as some extra time may be required to support arousal. Relaxation techniques can also support managing anxiety and help support setting the scene for intimacy and connection. It can also be supportive to look at alternatives to intercourse for intimacy.

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 and families identify what are their priorities for maximizing energy.
- Fatigue Severity Scale, Modified Fatigue Impact Scale or Brief Fatigue Index
- Pediatric Quality of Life Inventory (PedsQL™) Fatigue Scales

Resources:

Education

- Push/crash cycle Post-Exertional Malaise in Post COVID Recovery
- What we know about post-exertional malaise after COVID-19 - YouTube

- Fatigue and PESE WPTD2021-InfoSheet3-Fatigue-and-PESE-Final-A4-v1 (world.physio)
- Post-viral fatigue - Practical advice for people who have recovered at home (2).pdf

Energy Maximization (Conservation)

- AHS Patient Education Resource: Self-care: Managing your energy (alberta.ca)
- Practical advice for people during and after COVID-19: How to conserve your energy - RCOT
- AHS Post-COVID Provider Webinar: Maximizing Energy & Activities of Daily Living
- Pacing: http://www.phsa.ca/health-info-site/Documents/post_covid-19_fatigue.pdf
- 4 P's and task specific strategies https://www.stjoes.ca/patients-visitors/patient-education/a-e/PD%208278%20Energy%20Conservation.pdf

Activity/ symptom tracking

- Microsoft Word - Activity Rest Sleep Diaries and Daily Activity Diaries - Guidance for completing and calculating.doc (epsom-sthelier.nhs.uk)
- Logs, Forms & Worksheets to track your activity & symptoms: http://www.cfsselfhelp.org/library/type/log_forms_worksheetsd
- Symptom Journal: http://www.phsa.ca/health-info-site/Documents/post_covid-19_symptom_journal.pdf

Monitoring energy use/ energy budget

- Measuring effort for activities/ exercise: http://www.phsa.ca/health-info-site/Documents/post_covid-19-How_To_Manage_Your_Effort-Daily_Activities_and_Exercise.pdf
- Introducing concept of energy envelope/ budget : http://www.phsa.ca/health-info-site/Documents/post_covid-19-Intro_to_the_Living_in_your_Energy_Envelope_Tool.pdf
- Living in your energy envelope/ budget: http://www.phsa.ca/health-info-site/Documents/post_covid-19-Living_in_your_Energy_Envelope_Tool.pdf

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 patients 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)
- Sleep Hygiene Index: Sleep Hygiene Index (SHI) - Zesty Sleep
- Pittsburgh Sleep Quality Index (PSQI): https://www.opapc.com/uploads/documents/PSQI.pdf * Permission for use required at no cost through request form at Sleep measures / Instruments | Center for Sleep and Circadian Science (pitt.edu))

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
- Seattle Children's Hospital, Patient and Family Education - Sleep Hygiene for Children
- Seattle Children's Hospital, Patient and Family Education – Sleep Tips for Teenagers
- National Sleep foundation, How much sleep do we really need?

Cognition

Cognitive changes associated with COVID-19 include difficulty with attention/concentration, working memory and executive functioning. The term 'brain fog' is frequently used by patients to describe a loss of focus, vague memory problems or slowed processing or recall. Cognitive issues may be associated with encephalitis, stroke, hypoxia, or Post-Intensive Care Syndrome (PICS). One study of adult patients who required inpatient rehabilitation after prolonged hospitalization (mean age 64.5/ evaluated mean 43.2 days post- initial hospital admission) found 81% of patients had cognitive impairment. *Working memory* (55% of patients), *set shifting* (47*%), divided attention* (46%) and *processing speed* (40%) deficits were observed and were not significantly associated with length of time intubated, length of time since extubation, psychiatric diagnosis or preexisting cardiovascular disease. (Jaywant, 2021).

However, even non-hospitalized patients have demonstrated cognitive difficulties. In one study of adult patients who were never hospitalized and seen on average 4.7 months after onset of symptoms, 81% reported brain fog and performed worse on attention and working memory tasks than a demographically matched sample (Graham et al., 2021).

An Italian study by Buonsenso and colleagues (2021) with pediatric patients 162.5 ± 113.7 days post initial COVID-19 diagnosis found that persistent or delayed onset symptoms were not reported in 41.9% of patients, while 35.7% of patients reported one or two symptoms, and 22.5% reported three or more symptoms. The most commonly reported symptoms were fatigue (86.8%), insomnia (18.6%), nasal congestion/runny nose (12.4%), trouble concentrating (10.1%), myalgias (10.1%), weight loss (7.7%), joint pain/swelling (6.9%), skin rash (6.9%), constipation (6.2%), chest tightness (6.2%) and persistent cough (5.4%).

In addition to cognitive sequelae, psychiatric conditions such as depression and anxiety are expected to occur with higher prevalence in COVID-19 patients (Bailey et al., 2021). Mental health symptoms, and ongoing fatigue can also impact a patient's cognitive presentation. Thus, for many individuals it will be important for clinicians to provide education on lifestyle habits and routines; in conjunction with strategies and tools to manage cognitive changes.

- **Red Flags**:
  - Sudden onset of new impairment (delirium, stroke)
  - Safety concerns indicated through functional difficulties (cooking, driving, medication management)

- Yellow Flags:
  - Maladaptive coping; some patients may present with pre-existing stressors prior to COVID diagnosis (chronic illness, mental health/mood symptoms)
  - Changes related to communication/cognitive communication

- Social isolation
- In children difficulty following directions, completing schoolwork or chores

Functional Cognition

Treatment Considerations:

Provide Education on Factors that can Affect Cognition

Patients can feel lost or hopeless if they feel that they are not in control of improving their cognitive abilities. Providing education and tools and empowering patients to create changes in their routine can help shift the onus of control.

- Discuss sleep habits and provide education on sleep hygiene. A sleep log may be helpful to increase self-awareness of habits and what is and is not working. Help patients realize that they may require more rest than before becoming ill. Children may require more rest than before becoming ill.
- Educate patients and families on the link between rest/energy and how it can impact cognitive functioning.
- Normalize the stress associated with long-term symptom management and propose tools. Educate patients on how stress can impact cognitive functioning.
- Educate patients and families on energy maximization and pacing. Introduce tools such as the Pacing points system or Activity logs to increase self-awareness.
- For children encourage parents to set small, manageable goals with their child. An initial goal that requires 10-20% of change (e.g. if child can currently read for 10 minutes, set a goal of 12 minutes). Increase these targets in small, manageable increments. Praise children for achieving their goals and use rewards as desired to encourage success

Collaborate and Document Long-term Goals

Patients may show lapses in memory, concentration, and focus, from cognitive overload, direct consequences on the brain, persisting hypoxia, or fatigue. They may lose track of goals, plans, and steps. So reviewing and documenting their goals is important for organization and to monitor progress, especially when patients are uncertain, demoralized and have reduced memory or attention. Steps include:

- Help the patient keep track of learned information throughout sessions
- Review major goals and frame these larger goals into short-term achievable steps
- Provide and review homework and activities provided to your patient. Discuss feedback, the patient's experience and their perceived challenges. Involve family support as needed and emphasize the importance of accountability and follow-through.
- Identify and reflect on progress and reflect on goal attainment.

Managing Attention, Memory, Planning

Patients can get distracted, overwhelmed by details, and have trouble retaining specifics. They may also become overwhelmed by the whole experience of trying to manage therapies, on top of other roles. It's important to provide some structure to help manage this.

- Be structured – consider a written agenda for the session.
- Decrease cognitive load - focus on one thing at a time.
- Reduce distractors and try to work in a quiet environment.
- Take breaks and encourage your patient to learn to recognize opportunities for needed rest.
- Encourage written notes – for the session, or items to follow later on, to limit distractions.
- Take a minute at the start of the session to review the plan, take a minute at the end of the session to plan for practice, and the next step.
- For memory, use brief keywords; lengthy descriptions are excessive.

Cognition, Fatigue and Stress: "Brain Fog"

Everyone experiences some interference when we are stressed or tired, affecting how we use our thinking skills. When people are stressed or tired, they are more prone to lapses in memory and attention. They may feel this is a sign of cognitive deterioration. It is also important to remember thinking and concentration also takes effort, which is more obvious when people are recovering. Reading, using the computer, and similar activities are all more tiring during recovery, it is important to stop *before* you get fatigued.

- Normalize lapses – everyone has them. Post-COVID patients may report an increased frequency of these lapses. Reassure your patients that they will likely decrease as they feel more in control and use their tools.
- Encourage coping skills – deep breathing, relaxation, and setting time to refocus.
- Encourage reminder tools for activities and for breaks (alarms, using an agenda).
- Review activity level, and breaks.
- Pacing and energy maximization.
- Encourage an exit plan for when patients become fatigued or overwhelmed by cognitive or social activities - "Know when it's time to go".

School

School attendance may have been impacted by cognitive symptoms with attendance becoming sporadic or even stopping altogether. Staying out of school has negative impacts for children as it reduces opportunities for learning, social connection, and adherence to helpful structured routines.

Most schools can develop an individualized attendance plan to facilitate a full or gradual return to school as needed:

- Accommodations may include shortened school day, scheduling more frequent breaks, reducing workload, and allowing extra time for completion of schoolwork, temporarily eliminating or reducing homework, and developing a structured plan for catching up on missed assignments or schoolwork.
- Identifying a member of staff as a designated support person at school is also important.
- Support a gradual increase in school attendance (e.g. for a child who has completely stopped attending school start with 2 hours per day, gradually working up to half or full day as appropriate).

Use rewards and consequences to support planned school attendance. Rewards might involve use of a sticker chart for younger children or earning additional privileges for teens. Consequences for not attending school as planned, may include loss of leisure screen time for the school day in question.

Use Electronic or Written Aids

Patients often need reminders of specific details, and cues for planning and follow-through. Work with them to help use their preferred tools, or tools that family can support with. This can be written in a notepad, agenda, wall/fridge calendar, phone, or computer.

- Choose the tool they are most familiar with. Older adults often like pencil and paper, younger adults may prefer electronic tools.
- Consider alarms (on phone or computer) to cue specific tasks, such as homework time, stretches or activity.
- Use phone to record exercises or take photos as cues.
- For teens it may be helpful to use a phone to record exercises. Younger children may benefit from a picture based visual schedule.
- Consider separating main goals, progress reports, and specific activity plans/exercises.

Identify and Use Prior Strategies

Every individual comes to us with their own history and resources. Exploring and acknowledging these with your patients can be an important part of instilling hope and rebuilding self-agency.

- Does your patient like to plan in advance? Does your patient use self-talk to maintain focus, or put items out in preparation for tomorrow? Resuming old and helpful strategies increases control and self-direction.
- Set aside time to plan and review or prepare steps for potential challenges.
    - Managing physical or cognitive fatigue by setting breaks

    - Ensuring that family members know schedule so they can provide reminders if necessary
    - Review and practice homework.

- Work together with your patient, and their family, or other support people to identify potential solutions and next steps.

Review and Aid Patient/Family Review

Patients and their families will often get focused on the challenges of the day, which makes it easy to overlook progress they have made. Sometimes, this can also be important if we are working on a goal but making little progress, to suggest a possible change in goals, or strategies.

- Make a regular time to review progress, perhaps five minutes of the start or end of the week. When family are involved, get permission to get their feedback.
- Review what is happening outside of therapy activities is well. What is changing or progressing in life?

Catch Successes, Problem-Solve Lapses

Being ill, experiencing cognitive difficulties, having poor endurance and prolonged recovery is demoralizing. It's important to problem-solve difficulties, but also to identify the steps and strategies that either prevented difficulties or responded to them so they are no longer a barrier.

- Regularly review barriers and challenges, and both practical and motivational responses for these. Encourage your patient to generate these.
- Encourage your patients to record challenges and record the steps they have taken to manage and prevent challenges, as a problem-solving and motivational tool.

Reassurance and Increasing Independence

Being ill and relying on supports is demoralizing. Adult patients can develop some dependence and seek reassurance, so it is important to plan for independence and increasing self-reliance.

- When you are often being asked for reassurance, ask your patient – "What did we say before?" Encourage them to generate responses to their questions.
- Encourage your patient to plan activities they value and describe any tools they will use.
- If necessary, cue them to schedule leisure, productive, and social activities. Encourage brief initial activities and have an exit plan if they get fatigued or overwhelmed partway through. "The success lies in starting, endurance comes later"
- Support low intensity initial steps to their goals – participating in meal preparation, taking turns driving, as steps to independence. Flag the next steps.

Long-term goals and Timing

Patients will be eager to resume activities that are challenging and represent normalcy and a return to their baseline. Sometimes persisting symptoms and fatigue will be a barrier to retuning to certain activities. Timing of the return to school, work, and driving should be guided by the medical/therapy team.

- Patients will benefit from being provided with reassurance that recovery takes time and that return to more complex activities must be timed appropriately.
- Inform patients that they may require medical clearance to return to driving or work. This will depend on the severity of their course of illness.
- Factors such as fatigue, and mental wellness may also help to inform readiness to return to higher level cognitive activities.

Recommended Outcome Measures:

- For Adult patients in addition to traditional cognitive screens that identify mild cognitive impairment (such as SLUMS, ACE-III, or RUDAS) consider adding a screen that tests processing speed (such as Trail-Making or Symbol Digit Modality Test).

Resources:

- MHA - Brain Fog
- MHA - Memory tips for daily tasks
- Patient video: https://www.euro.who.int/en/health-topics/Life-stages/disability-and-rehabilitation/multimedia/video-gallery-rehabilitation-self-management-after-covid-19
- Patient resource via NHS: https://www.yourcovidrecovery.nhs.uk/managing-the-effects/effects-on-your-mind/memory-and-concentration/

Cognitive Communication

Cognitive and emotional disturbances observed in individuals recovering from COVID-19 can have a significant impact on their functional communication abilities.

Temporary and permanent brain damage can occur in patients with COVID-19 due to intermittent or chronic hypoxia (resulting from acute respiratory distress syndrome) or from inflammation and/or coagulation within the vascular system resulting from the immune system's response to the COVID-19 virus (Ramage, 2020).

Cognitive-communication disorders are defined as communication deficits (e.g. listening, speaking, reading, writing, social interaction) resulting from underlying cognitive impairments. Cognitive impairments associated with COVID-19 include slowed speed of information processing, reduced orientation, attention and concentration difficulties, memory problems and executive functions. These impairments can result in a variety of communication deficits that include difficulties:

- Comprehending spoken or written information in a timely, reliable manner – slowed information processing may make it difficulty to keep up during a rapid conversation, especially when there are multiple speakers or when the environment is distracting.
- Speaking or writing in clear, organized fashion – expression may be inefficient (i.e. low information content conveyed relative to the number of words produced) and disorganized (drifting from topic to topic, and containing tangential or irrelevant remarks).
- Retrieving the right words in a timely manner
- Interpreting and using abstract language (e.g. humour, metaphors)
- Recalling conversations or steps to complete new tasks
- Interacting in a socially appropriate manner – this can include a tendency to monopolize conversations, difficulties maintaining a conversational topic, exhibiting limited interest in conversational partners or failure to correctly interpret non-verbal forms of communication (e.g. tone of voice, facial expression).

Cognitive-communication impairments can have a significant impact on an individual's psycho-emotional status, social participation and their success returning to previous life roles (MacDonald, 2017).
Referral to an SLP is indicated when a change in an individual's communicative ability is observed in any of the areas described above.

Patients recovering from COVID-19 should receive early screening of cognitive and cognitive-communication abilities by an interprofessional team. Cognitive-communication screening should focus on identification of an individual's communicative strengths and limitations as well as environmental factors that support effective communication. If screening identifies areas of concern, a more comprehensive assessment should be completed to better understand the individual's underlying cognitive impairments, the resulting impact on their communication abilities in real world situations and to develop functional treatment goals. Assessment tools should include performance and self-report measures.

Red Flags:

- ☐ Prolonged mechanical ventilation, evidence of cognitive dysfunction, acute respiratory distress syndrome (ARDS), evidence on brain damage based on findings of diagnostic imaging tests, episode of delirium
- ☐ Cognitive assessment identifies difficulty with verbal fluency, comprehension, expression, attention, memory, social communication, problem solving, reasoning and self-awareness

- Struggling to return to pre-COVID activities and roles (e.g., work, school, organization, social relationships) due to communication demands

Yellow Flags:

- Reduced communication confidence or desire for social interaction
- Social Isolation

Treatment Considerations:

Speech-language pathologists perform an essential role in the early identification and remediation of cognitive-communication disorders.

Treatment of cognitive-communication disorders should start as early as possible to enhance recovery, functional performance and quality of life of individuals recovering from COVID-19. Cognitive-communication rehabilitation is most effective when provided by an interprofessional team.

Cognitive-communication rehabilitation domains can include comprehension, expression, attention, memory, social communication, problem solving, reasoning and self-awareness.

The following areas should be considered in developing an intervention plan to support individuals with cognitive-communication deficits:

- Education and counseling to patients, families and the interprofessional team about the nature and functional impact of cognitive-communication deficits
- Training patients and caregivers in the use of Communication Access tools and strategies to optimize a patient's ability to participate in the care they receive.
- Inclusion of family and significant others in individual and group treatment sessions to promote understanding of the patient's challenges and practice using communication strategies
- Use of assistive technology to support day-to-day function (e.g. memory and organization aides)
- Training in use of compensatory and metacognitive strategies to address functional goals in real life settings – treatment should occur in natural contexts that are meaningful to the patient and support their activity and participation in daily routines.
- Environmental modifications to reduce cognitive demands and improve success of communicative interactions – e.g. reducing clutter, eliminating distractions, developing structured daily routines
- Daily activity scheduling to support management of cognitive fatigue
- Identification of strategies that support management of behavioral and emotional concerns
- Group therapy sessions to practice and generalize use of compensatory strategies and skills in real-world situations and to receive peer feedback and support

Recommended Outcome Measures:

Adult

- Cognitive-Communication Checklist for Acquired Brain Injury (CCCABI)
- Oxford Cognitive Screen (OCS)
- Cognitive Linguistic Quick Test (CLQT)
- Behavior Rating Inventory of Executive Function-Adult (BRIEF)
- La Trobe Communication Questionnaire (LCQ)

Pediatric and Adolescent

- Behavior Rating Inventory of Executive Function-Pediatric (BRIEF)
- Pediatric Evaluation of Disability Inventory Version II (PEDI II)
- BNI Screen for Higher Cerebral Functions for School-Age Children (BNIS-C)
- Student Functional Assessment of Verbal Reasoning and Executive Function (S-FAVRES)
- Pediatric Test of Brain Injury (PTBI)

Resources:

- Cognitive-Communication Checklist for Acquired Brain Injury (CCABI)
- MacDonald, S. (2017). Introducing the model of cognitive-communication competence: A model to guide evidence-based communication interventions after brain injury, Brain Injury, 31:13-14.
- Ramage, AE (2020). Potential for Cognitive Communication Impairment in COVID-19 Survivors: A Call to Action for Speech-Language Pathologists.

Voice and Upper Airway Respiratory Issues

Dysphonia and dyspnea are common early symptoms of COVD-19. These difficulties may persist or worsen beyond the acute phase of the infection. Some of these symptoms may require focused upper airway (laryngeal) diagnostic workup and intervention for both adults and children.

Post acute COVID-19 laryngeal injury and dysfunction may have a number of different etiologies. The causes may be neurogenic, structural, functional, or a combination of these. Examples of laryngeal sequelae are posterior glottic or subglottic stenosis, intubation granuloma, vocal fold paresis/paralysis, chronic laryngitis, vocal fold atrophy, muscle tension dysphonia, and paradoxical vocal fold motion. Symptoms can span a broad range of severity, acuity and functional impact. Laryngeal injury or dysfunction should be considered in patients presenting with stridor/inspiratory dyspnea (particularly post extubation), or new-onset and/or progressive dysphonia. Comprehensive diagnostic assessment including laryngoscopy is warranted prior to any intervention for these upper airway symptoms. An interdisciplinary team including voice/upper airway specialized ENT and SLP will continue to play an integral role in assessing and treating these patients, in coordination with primary care providers.

> *Indeed, early otolaryngology evaluation for voice, airway and swallowing dysfunction remains critical as we seek to manage or prevent long-term laryngotracheal sequelae that could have lasting impacts on quality of life.* (Neevel et al., 2021, p.7)

Referral Triggers/Red Flags

- **Red Flag: stridor**
  - Further assessment is warranted. Refer to ENT or urgent care (depending on clinical presentation.)
- **Red Flag: severe dysphonia/aphonia**
  - Further assessment is warranted. Refer to ENT or urgent care (depending on clinical presentation.)
- **Yellow Flag: inspiratory dyspnea**
  - Further assessment is warranted. Refer to ENT.
- **Yellow Flag: new-onset or progressive dysphonia**
  - Further assessment is warranted. Refer to ENT.

Treatment Considerations:

- Patients and their families should receive general information on care of the voice (e.g. resting the voice as needed, avoiding straining or pushing the voice, avoiding prolonged loud voice use and optimizing hydration.)
- Structural abnormalities (e.g. posterior glottic or subglottic stenosis, intubation granuloma) may require surgical intervention).
- Chronic laryngitis may be managed medically.
- Vocal fold paresis/paralysis may be managed with operative or in-office surgical procedures and adjuvant voice therapy. Children may need to wait until they are older for surgical intervention.
- Vocal fold atrophy may be addressed with operative or in-office surgical procedures. Voice therapy may be used to address milder atrophy or vocal deconditioning/vocal fatigue.
- Functional/muscle tension dysphonia is typically addressed and managed via voice therapy.
- Functional (upper airway) breathing disorders such as paradoxical vocal fold motion (PVFM) can be managed with behavioural intervention.

Resources:

- Prevalence of dysphonia in non-hospitalized patients with COVID-19 in Lombardy, the Italian epicenter of the pandemic.
- Features of mild-to-moderate COVID-19 patients with dysphonia.
- Persistent dysphonia in hospitalized COVID-19 patients.
- Laryngeal complications of COVID-19.
- Postacute COVID-19 laryngeal injury and dysfunction.

Eating, Feeding and Swallowing

Eating, feeding, and swallowing concerns may result from COVID-19 for patients and their families regardless of the initial severity of their condition. It occurs in people who have and those who have not required hospitalization. Difficulties range from aspiration during swallowing to reduced enjoyment of eating due to loss of taste and smell. Dysphagia (difficulty swallowing) is commonly observed in patients diagnosed with COVID-19 (Dawson et al., 2020) and is an independent predictor of severe COVID-19 infection (Pulia, 2021).

Acute respiratory distress syndrome (ARDS) is the most common symptom of COVID-19 observed in critically ill hospitalized patients. These patients are typically admitted to ICU and require invasive medical treatments to manage their respiratory failure (e.g. mechanical ventilation, proning, and extracorporeal membrane oxygenation (ECMO) for multi-organ failure). These treatments and the underlying physiological impairments are significant risk factors for the development of dysphagia, aspiration, and negative sequelae of aspiration. Difficulty coordinating respiration and swallowing is a primary cause of dysphagia in persons recovering from COVID-19 (Ranjini and Mohapatra, 2020).

In addition to respiratory complications, patients with COVID-19 are at risk of developing critical illness polyneuropathy and myopathy and other neurological complications such as stroke, encephalitis, and Guillain–Barré syndrome (Dziewas et al., 2020). All of these conditions are significant risk factors for dysphagia.

Research demonstrates that not identifying swallowing concerns can lead to poor patient outcomes, including respiratory morbidity and mortality (Macht, 2011), and increase the length and cost of hospital admissions (Ferraris, 2001). All hospitalized patients recovering from COVID-19 should be screened for swallowing concerns as soon as they are alert and ready to trial oral intake. Patients reporting or exhibiting signs of swallowing difficulty or risk factors for dysphagia should be referred to a dysphagia therapist for a comprehensive assessment.

Dysphagia therapists draw from knowledge of respiratory disorders, critical care, and neurology populations in the assessment and management of individuals recovering from COVID-19. This includes physiological factors related to aspiration risk (Steel and Cichero, 2014), aspiration pneumonia (Langmore 1998; 2002), prolonged intubation (Skoretz, 2010), and tracheostomy (Macht, 2011).

Pediatric Considerations

In pediatrics, children who have experienced multisystem inflammatory disease have been reported to have increased incidence of dysphagia which may be the result of the airway inflammatory process or secondary to intubation (Cheong et al., 2021). The recommendation was made that all children with Pediatric Inflammatory Multisystem Syndrome (PIMS) should be screened for dysphagia (Halfpenny et al., 2021).

Clinical considerations in managing swallowing concerns in individuals recovering from COVID-19 include:

- Lung damage is frequently observed in patients recovering from COVID-19 resulting in greater risk of suboptimal ventilation and a subsequent risk of abnormal coordination of the respiratory and swallowing cycle
- Critically ill COVID-19 frequently needed to be maintained in a prone position for extended periods of time. This can increase their risk of aspiration, interfere with safe provision of oral hygiene and affect breath-swallow pattern and timing (Dawson et al., 2020)
- Airway inflammation and tracheobronchitis are observed even in the absence of mechanical ventilation.
- Delirium is frequently observed in patients with COVID-19 who have been admitted to hospital.
- Oral hygiene is especially important for patients with COVID-19 as aspiration of oropharyngeal bacteria induces the expression of angiotensin-converting enzyme 2, a receptor for SARS-CoV-2, and the production of inflammatory cytokines in the lower respiratory tract. Consequently, poor oral hygiene can lead to COVID-19 aggravation (Takahashi et al., 2020).
- The medical status of patients with COVID-19 may fluctuate dramatically and without warning during the acute care phase, necessitating close monitoring of overall status and impact on swallow function.

Risk factors for dysphagia include:

- prolonged intubation (> 48h) and/or repeated intubation
- tracheostomy
- diagnosis of acute or progressive neurological condition (e.g. traumatic brain injury, stroke, Parkinson disease)
- dependency for self-care (e.g. feeding, oral hygiene)
- critical care neuropathy and deconditioning
- altered level of consciousness (sedation, delirium, impaired attention, impulsivity)
- poor respiratory status including need for supplemental oxygen or increased respiratory rate
- recent pneumonia, delirium, acute respiratory distress syndrome

Red Flags

- difficulty managing oropharyngeal secretions
- patient complaint of difficulty swallowing (e.g. coughing or choking episodes, food sticking in throat, regurgitation of food)
- signs of airway penetration or aspiration during or after oral intake (i.e. coughing, throat clearing, change in voice quality, change in respiration)

- absent or altered voice quality
- weak spontaneous or volitional coughing and throat clearing
- significant dysarthria of speech (e.g. weak, imprecise articulation)

Yellow Flags

- pain, irritation or globus sensation reported when swallowing
- difficulty meeting hydration or nutrition needs orally
- reduced appetite
- lifestyle changes resulting from dysphagia or COVID-19 (e.g. increased social isolation, reduced interest in preparing food)
- refusing or spitting out food
- shortness of breath at rest or with exertion/activity; difficulty coordinating respiration and swallowing

Treatment Considerations:

- An integrated multi-disciplinary team is required to assess and manage the complex etiology of eating, feeding and swallowing difficulties associated with COVID-19 and to manage concurrent demands related to respiratory health, nutrition, hydration, swallowing rehabilitation, medication requirements, and other health needs.
- Individuals recovering from COVID-19 often experience persistent respiratory deficits (e.g. shortness of breath) and symptoms of physical and mental fatigue ("brain fog"). Respiratory issues can affect swallowing safety by impacting the ability to coordinate breathing and swallowing. Marked fluctuation in the respiratory status of patients recovering from COVID-19 is common and therefore close monitoring of swallow function is essential.
- To manage fatigue and respiratory issues during mealtimes, the following strategies are recommended:
  - Eat smaller, more frequent meals throughout the day.
  - Take a rest break before meals to optimize energy.
  - Allow more time to eat meals – stop and rest if feeling short of breath or fatigued, take small bites/sips, try eating softer foods that require less chewing
  - Limit talking during meals to avoid shortness of breath.
  - Consider positioning: Sitting at a table in a supportive chair maximizes energy for both breathing and feeding.
  - Meal time aids are available to support weakness/ fatigue; if needed consult an OT.
- Patients recovering from COVID-19 may experience changes in their smell or taste. This can have a significant impact on appetite. The following strategies are recommended to support adequate nutrition and hydration and enhance the enjoyment of eating:
  - Increase the sensory experience of foods by selecting foods with a variety of textures and temperatures.

    - Enhance the range of flavor by preparing foods that stimulate all of the tongue's taste receptors (e.g., saltiness, sweetness, bitterness, and sourness)
    - Make the presentation of foods as appetizing, as possible
- Facilitate bolus transit and reduce throat irritation by alternating between bites of food and sips of liquid. Also consider blended or softer foods during recovery.
- Instrumental assessment is strongly recommended for patients who have or had a tracheostomy and exhibit signs/symptoms of dysphagia or have dysphagia risk factors in their case history. Instrumental assessment is also strongly recommended for patients who are unable to tolerate any deflation of a cuffed tracheostomy.
- Also refer to the Nutrition section of this document

Telephone sessions are unlikely to adequately replace Face to Face (FTF) or synchronous videoconferencing, especially for moderate or severe dysphagia. However, videoconferencing can be used to triage patients, identify the need for urgent or FTF follow up, and provide education to aid in reducing risks of aspiration in the interim (See Dysphagia Assessment and Treatment During the COVID-19 Pandemic: Lessons Learned from the Transition to Telepractice).

Recommended Screening Tools and Outcome Measures:

- Dysphagia Handicap Index
    - Self-report measure of the handicapping effect of dysphagia on the emotional, functional, and physical aspects of a person's life
- Eating Assessment Tool (EAT-10)
    - Self-report measure of swallowing difficulties.
      Microsoft Word - EAT-10.doc (bccancer.bc.ca)
- Post COVID-19 Functional Status Scale and Post COVID-19 Symptom Checklist (albertahealthservices.ca)
- Feeding Matters – Screen (include age range)

Resources:

- AHS Patient Resources:
  Symptoms: Eating, Feeding, and Swallowing Problems
  Swallowing Difficulties Overview
  Swallowing X-rays – Barium and Modified Barium

- Alberta Health Services Allied Health Dysphagia Intervention during COVID

- Alberta Health Services Rehabilitation after COVID-19– Allied Health Provider Education Series Nutrition, Eating, Feeding & Swallowing Presentation | Recording

- Dawson et al. (2020). Dysphagia presentation and management following COVID-19: an acute care tertiary centre experience. Journal of Laryngology and Otology, 1-6.
- Dysphagia Care Across the Continuum: A Multidisciplinary Dysphagia Research Society Taskforce Report of Service-Delivery During the COVID-19 Global Pandemic)
- Dysphagia Assessment and Treatment During the COVID-19 Pandemic: Lessons Learned from the Transition to Telepractice
- Managing problems with eating, drinking and swallowing available at: WHO/Europe | Disability and rehabilitation - Video gallery - Rehabilitation self-management after COVID-19
- Namasivayam-MacDonald, A. and Wong, J. (2021) Managing Dysphagia in Patients with COVID-19 in Acute Care and Beyond: Facilitators and Barriers to Practice (2021) Speech-Language and Audiology Canada Webcast
- PEAS Pediatric Eating and Swallowing
- Shedding Light on Dysphagia Associated With COVID-19: The What and Why.
- Speech Pathology Australia: Guidance for service delivery, clinical procedures and infection control during COVID-19 pandemic Version 8: 24 August 2020

Psychosocial Impacts

The amount of literature on the effects of the COVID pandemic on children and teens in general is starting to be quite substantial. The specific psychosocial effects on children and teens has been documented worldwide. In a recent study of adolescents and mental health (Donmez and Ucur, 2022) in Turkey, results showed that 49.9% of the participants had anxiety symptoms, 29.5% had depression symptoms, and 51.4% had irritability symptoms. Younger age was determined to be a potential risk factor for anxiety symptoms, and female gender was a potential risk factor for anxiety and depressive symptoms. Having a COVID-19 death in the family or home environment was also suggested to be a potential risk factor for depression and irritability symptoms, while television and internet exposure to COVID-19 information was found to be a potential risk factor for anxiety, depression, and irritability symptoms. A study by Caffo, Asto, and Scandroglio (2021) in Italy suggested some similar predictors in the negative effects on mental health in children and teens. Some of the factors suggested as predictors included social isolation, excessive screen time and social media exposure, higher levels of parental stress and poor parent-child relationship, low socioeconomic status, and presence of pre-existing (to COVID) mental health conditions or disabilities.

The amount of research specifically on the psychosocial effects of post COVID conditions on pediatric patients and families is still limited and diverse. In a review of post COVID research Zimmerman et al. (2021) found that, in children, the risk of coronavirus disease (COVID) being severe is low, the risk of persistent symptoms following infection with SARS-CoV-2 is uncertain, and symptoms of “long COVID” are poorly defined. They concluded that long-term or post–COVID infection associated symptoms are difficult to distinguish from pandemic-associated symptoms.

However, In North America, a 2021 report by the United States Department of Health and Human Services suggested that, following a COVID-19 diagnosis, adolescents were almost 4.5 times more likely to experience depression than younger children, aged 6 to 11 years old (37.9% versus 8.6%). The pre-existence of adverse childhood experiences (e.g., child abuse and neglect), death of a family member, addiction in families, and certain psychosocial events (e.g., criminality in family) substantially increased the likelihood of young people experiencing a mental health condition, post-COVID infection. Parental metal health concerns have also been found to be associated with their children's mental health

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 and their families do better when we

pay attention to their physical and psychological symptoms and needs, as well as their spiritual and social needs and considerations.

- Patients and caregivers may be stressed or distressed, and may experience multiple stressors individually, and as a family.
- 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 and their families to share and build trust and rapport
- Be curious: try to ask open ended questions in a narrative manner to find out what matters most to the patient
- Approach patients and families in a calm, caring manner, making eye contact and speaking at an unhurried pace. Be cognizant that not all cultural groups interact in this specific manner (For example, less direct eye contact is made with some cultural groups and signals that they are finished speaking, as opposed to having something to say).
- Use normalizing language, emphasizing that stress impacts people in different ways, and that different people cope with it in different ways.
- When working with children or youth, take care to confirm and validate the child's or teen's report of troubling symptoms, as well as related issues the family or caregivers may mention. This not only helps the patient and family feel heard but serves to ensure a correct understanding between the patient/family and health care worker.
- Use familiar wording and clear language that is appropriate for the age and developmental level of any children. Some of the more complex medical terminology and diagnoses may require explanation; Try to avoid using too much medical jargon and explain things in a way pediatric patients and their families will understand.
- Use active listening skills, such as summarizing or paraphrasing to ensure you and the patient, caregiver or family member 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?
  - What would you like to talk about related to how things are going?
  - Have you been finding challenges with how you are thinking or feeling? What are those challenges or problems?
  - Have 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 in your usual routines and activities? What kinds or problems?
- Recognize that the impacts of the pandemic influence all of us in various ways.
- Note the strengths of the individual and provide patients and caregivers 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 that is outside your scope of practice.

Signs of Distress in Children and Teens:

- Encourage Parents and Caregivers to monitor their children for signs of stress and mental health issues post COVID. Signs of stress and mental health challenges are not the same for every child or teen, but there are some common signs or symptoms associated with these issues that are different for certain age groups of pediatric patients:

  - Infants and younger children may show a decline in skills or regression in developmental level. Caregivers may need to monitor their child for:

    - an increase in fussiness or irritability, startling or crying more easily, or the child is difficult to console when upset.

    - trouble falling asleep or waking up more often during the night.

    - issues related to feeding/eating, such as nausea or vomiting, constipation or loose stools, or new complaints of stomach pain.

    - an increase in anxiety when they have to be away from the family, clinginess, not wanting to socialize, or they fear going outside.

    - an increase in aggressive behavior, such as hitting, biting, or more frequent or intense tantrums.

    - bed-wetting after the child has successfully been potty-trained.

  - Older children and adolescents may show signs of distress, such as:

- changes in mood for the child that are unusual or uncharacteristic, such as increased irritability, feelings of hopelessness or anger, or more conflicts with friends, family, or school staff.
- changes in behavior, such as increased withdrawal from personal relationships or obligations (e.g., chores, appointments).
- A decrease of loss of interest in previously enjoyed activities or interests.
- an increase in sleep issues such as in time falling or staying asleep or feeling sleepy/tired all the time.
- changes in eating patterns/appetite, such as not eating a lot or feeling hungry all of the time. A marked increase or decrease in weight may also be cause for concern.
- changes in appearance, such as a decrease of basic personal hygiene activities.
- trouble with memory, thinking, or attention/concentration.
- decreased interest in schoolwork, or drop in academic effort or performance.
- an increase in risk-taking behaviors, such as using drugs or alcohol.
- expressed thoughts or comments about death or suicide, or engaged in self-harming behaviours (e.g., cutting, reckless behaviour).

Parenting Tips and Considerations:

- Encourage parents and caregivers to regularly check in with their child, asking them how they are doing/feeling, and reminding them that they are there to talk when the child or teen is ready.
- Remind parents/caregivers that some children or adolescents may require more time or space to express themselves. Some may do better with gradual conversations and other activities besides talking (e.g., artwork), while others might be more comfortable with direct conversations or activities (e.g., counselling).
- Encourage parents to see themselves as a primary ‘agent of change’ in responding to psychological distress associated with post-COVID symptoms. Research indicates that an ‘authoritative parenting style’ is most effective in supporting children who are struggling with chronic illness:
    - In this parenting style, the parents are nurturing, responsive, and supportive, yet set firm limits for their children.
    - It is helpful for parents to adopt a position of understanding/acceptance of their child’s symptoms, while focusing on explicit problem-solving strategies to address specific concerns.

- Encourage parents to help the child or teen to talk with a trusted friend or family member if they do not wish to talk with the parent or primary caregiver about their problems.
- During the pandemic contact restrictions, or due to post-COVID symptoms, children/teens may not be able to physically interact or talk in-person with their with peers/trusted adults. In such cases all attempts should be made to ensure the child/teen has access to other forms of interpersonal interaction, such as online play dates for younger children, or teleconfrences/online chats and text messaging for teens.
  - Parents may need to communicate with their child's friends' caregivers/family to arrange such to ensure the child/teen feels connected to a support network, and has the time to socialize to some extent.
  - For older asdolescents and teens, parental support for communication with peers should also include some private communication to alllow their child to feel some independence and be able to interact freely with their peers, within some reasonable limits (e.g., a specific amount of 'screen time' per day with peers). Interactions may include online gaming with friends, which parents can also support within reasonable expectations (e.g., time limits per day of game time such as half an hour per day is recommended for adolescents and an hour for teens as opposed to unrestricted time.
- Remind parents/caregivers to monitor and maintain their own mental health. Many studies have associated parental mental health with their children's mental health. Thus, it is of significant importance for parents/primary caregivers to ensure they are maintaining their own mental health effectively, or utilizing health care or social services to help manage mental health conditions, in order to minimize impaxt on the children under their care.

Other Practice Considerations:

- Try to be aware of any cultural or language considerations that need to be considered in treatment and treatment planning with a pediatric patient or their family and caregivers. For example, English may not be the first language of immigrant families and translation services may need to be accessed to ensure effective communication with patients and caregivers.
  - Sometimes the pediatric patient or another family member may take on the role of translator between the health care provider and family/caregivers. The translator may view this as an additional source of stress, adding to any other stressors. While it may be convenient for the patient to translate, it is not a replacement for a professional translator, or unit staff member that speaks the guage, versed in health care terminology who can ensure that there is a complete understanding of the patient's health care concerns with involved family members.
  - If the pediatric patient does end up having to be the primary translator beteween the health professional and the family/caregivers, frequent check-ins should be done with the child/teen to ensure that:
    - the patient understands the information first, prior to translation to the family or caregivers; and

- the patient is comfortable and not overly stressed by the translator role.

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
- COVID-19 Mental Health Resource Hub
- SickKids Mental Health Learning Hub
- Patient Care Handouts (alberta.ca)
- Caring for People with Post-COVID Conditions
- Children & Youth | Alberta Health Services
- Long-COVID Income Benefit Programs.pdf (ahsnet.ca)
- Long COVID Kids
- Long COVID Video
- SIGN Long COVID patient booklet
- COVIBOOK | Mindheart
- Mental Health: Coping and Connection for Children & Families During COVID-19 (albertahealthservices.ca)
- Identifying Financial Strain and Addressing Financial Barriers to Health course moduled available on MyLearningLink
- Network of excellence – supporting caregivers - Network of Excellence in Seniors' Health & Wellness - Covenant Health
- Domestic violence education and resources - Project VEGA | Home (mcmaster.ca)
- Addictions –PACES | Alberta Health Services
- Suicide prevention, risk assessment and management (SPRAM) Suicide Prevention, Risk Assessment & Management | Alberta Health Services
- Patient and caregiver support needs Caregiver Centered Care (caregivercare.ca)
- Support Needs Approach for Patients (SNAP) Training | SNAP - Support Needs Approach for Patients (thesnap.org.uk) How are you? (albertahealthservices.ca)
- Carer Support Needs Assessment Tool (CSNAT) Training | (csnat.org) Your Support Needs (CSNAT) (albertahealthservices.ca)
- Inventory-of-Resources-Supports-for-Caregivers-in-Alberta.pdf (seniorsnetworkcovenant.ca)
- Decision-Making Capacity - Decision-Making Capacity Assessment - Covenant Health

Spiritual Impacts

Understanding and Responding to Spiritual Distress in Patients Recovering from COVID

Difference between Spirituality & Religion
Spirituality is a broader concept than religion: not all people identify as religious but the spiritual attributes of meaning, values, transcendence, connecting and becoming may be universal.

Understanding Spiritual Distress
Spirituality addresses sources of wellbeing, needs and issues related to meaning, values, transcendence, connecting and becoming. The experience of COVID impacts all these spiritual dimensions. Questions of meaning may surface for patients. Visitation restrictions may have challenged health care providers' patient-centered values and patients' opportunities for connection with others. Individuals may have suffered disruptions to their beliefs about themselves, others and the health care system. The experience as a whole may have impacts on personal growth and development. These all may be expressions of spiritual distress.

AHS Definition of Spiritual Distress
The loss of meaning and connection in relationship with self, others and Other, (what one considers ultimate/transcendent). The latter may or may not be a deity; it might be a philosophy, nature, the universe etc.

Practice Considerations:

- It is important to recognize that patients may express spiritual distress in both religious and in non-religious terms.
- Examples of Symptoms of Spiritual Distress:

  Loss of Meaning and Connection with Self
  - **Symptom:** loss or diminished sense of self e.g. "I don't feel like myself anymore," "I don't recognize myself anymore," "I feel numb," "I always thought I was a person of faith but now I'm not so sure."

  Loss of Meaning and Connection with others
  - **Symptom:** Expressed sense of isolation and or abandonment e.g. "I'm afraid to go out and be among others now that the restrictions have lessened in public settings." "I feel like I can't relate to others like I used too." "I just can't keep up with others." "I used to love going to Church but now I have no desire."

  Loss of Meaning and Connection with Other (what one considers ultimate/transcendent)
  - **Symptom:** Asking Why? Existential questions surface in many forms. Examples: "It's just not fair!" "How much longer is this going to go on?!" "Why is this

happening?" "I feel like everything is falling apart!" "How could God let this happen?"

Practice Tips. Recognize what keeps you in an emotionally regulated space (referred to in trauma-informed care as your "window of tolerance") and recognize what helps you maintain meaning and connection in your life.

- **Be Compassionate Toward Yourself and Others**
  - Recognize emotional triggers, traumas, and what drains you and your need for self-care. Practice Self-Compassion such as saying "It's okay to not be okay."
  - Allow patients the space to share their experience with you. Listen. Be present in the moment. Acknowledge pain and suffering. Validate emotions; try not to minimize or rush to find a solution. Your compassionate presence is therapeutic.
  - Listen to patients' laments: Spiritually, patients are able to engage the reality of their inner suffering and allow themselves to give voice to their questions, express their grief, desires, what they have trust/confidence in and what they give gratitude for.

- **Consider Engaging a Spiritual Practice:** these can help you and your patients develop and maintain resilience. The following descriptions offer a brief introduction to a variety of spiritual practices. A step-by-step guide to each spiritual practice may be accessed here: Spiritual Care Practices.
  - **Self-Compassion** is a practice to help you be kind, caring and understanding of yourself. It can help you cope in tough times; help you to show kindness and compassion to others; improve your mental health and wellbeing; and improve your life satisfaction and happiness.
  - **Gratitude** is a practice that can help you focus on what you have, rather than what you don't have. Practicing gratitude can improve overall sense of wellbeing; promote positive thoughts and feelings; strengthen relationships and sense of connection with others; and increase spiritual awareness.
  - **Lament** is a spiritual way to process to your own suffering through expressing grief or loss, desire, trust, and gratitude. Practicing lament in tough times can help you shift from "unbearable suffering" to "bearable suffering." It can help you express your emotions, without judgement; know that you are not alone in feeling this way; engage with your inner suffering and give voice to your questions.
  - **Breath Meditation** is an awareness practice that helps bring you back to the present moment. This practice can help you develop a sense of grounding and connection; improve concentration; decrease anxiety and depression; and improve overall sense of wellbeing.

- **Contemplative Reading** is a practice that opens you to deeper connection and meaning/wisdom through reading short pieces of inspirational or sacred texts.
- **Find the Feeling** is a practice that helps you recognize, experience, and understand your emotions. It can help you become more comfortable with experiencing strong emotions. This practice can help you build emotional resilience.
- **Labyrinth Walking** helps you to be in the present moment through walking a single, winding path with one entrance that leads to a centre and back out. This practice can help you feel calm, focused and connected. Benefits of walking the labyrinth include: feelings of calmness and relaxation; improved focus; reduced anxiety and stress; and insight.
- **Mantras** are a spiritual practice in which a sacred word is repeated over and over. It is a form of meditation that can support spiritual wellness and coping and connect you with what is meaningful in your life.
- **Taking and Sending** is a spiritual practice that helps you see and acknowledge painful situations while creating meaningful connections with others. This practice can help you find courage through a deep sense of connection when things feel uncertain. In doing this practice, you may begin to feel care and love for yourself and others.

- Consider **referral** to a Spiritual Health Practitioners to address complex spiritual distress. Please see Spiritual Health Practitioner Interventions to Address Symptoms of Spiritual Distress: An Interprofessional Spiritual Health Care Practice Wise Resources

Resources:

- Indicators of Spiritual Distress: Symptoms of Spiritual Distress. Interprofessional Resource
- AHS Spiritual History Tool
- How do Health Care Providers Take a Spiritual History?
- Spiritual Practices to Support Resilience: Spiritual Care Practices
- How to offer Practical Compassion: Interprofessional Spiritual Health Care Practice Wise Resources (albertahealthservices.ca)
- Spiritual Care | Insite (albertahealthservices.ca)

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. 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 • Fatigue or low energy • Loss of taste/taste changes • Impaired or loss of smell	• Slowed growth pattern or growth faltering in children • Constipation • Difficulty swallowing	• Unintentional weight loss or gain • Malnutrition • Diarrhea • Nausea and vomiting

Additional Nutrition Considerations – Decreased access to food and/or household food insecurity:

- Food insecurity may also be an issue for some people as they may be unable to return to work due to ongoing symptoms.
- Children who miss school or social activities may not access food programs in place.
- Social isolation, government lockdown orders, difficulties getting to a grocery store, or limited food choices in one's community can significantly impair a patient's ability to access foods. The ability to afford basic needs, including food, will impact patients' recovery. Screen patients and connect them to supports and services.
- For immediate patient concerns regarding food access see: Free Food in Alberta Information for Albertans

As rehabilitation clinicians, it is 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 Dietitian:

- Health Link has registered dietitians available to answer nutrition questions. If your patient has a nutrition question about COVID-19, they can call 811 or the Rehabilitation Advice Line (1-833-379-0563), to be referred to a Health Link 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 or visit Referring Patients for Nutrition Services [https://albertahealthservices.ca/nutrition/Page17636.aspx].

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
- AHS Nutrition Services: Nutrition Services HP | Alberta Health Services

Outpatient Caseload Management & Prioritization

Prioritizing caseloads can be challenging, especially when working with post-COVID patients. 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 A.

Priority Level	P1	P2	P3
Urgency	Urgent	Semi-urgent	Routine
Assessment Time Frame	Program dependent	Program dependent	Program dependent
Considerations	• Patient safety is a primary concern • Recent ICU admission • High risk for hospital re-admission • High O2 requirements (compared to baseline)	• Recent hospital admission • Patient has not yet returned to work, school or typical activities of daily living • PESE or other sequelae are prevalent • Self-management resources are insufficient	• No identified safety issues • Ability to access other supports (i.e. RAL, AHLP education) • Are using self-management resources or supports

Appendix A:

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 recovery 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 patients 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. Healthcare providers are encouraged to factor in which resources and services are available in each situation to support their patient's unique needs. The majority of patients can self-manage with appropriate resources and supports.

Resources for ALL patients (PCFS Score 0-4)

Universal Self Care Resources should be shared with ALL patients as early as possible.

Getting Healthy After COVID-19: Resources for Patients

After COVID-19: Information and resources to help you recover

Targeted Resources (PCFS Score 2-3)

Services designed for groups of people with a common need.

Alberta Healthy Living Video Series

Personalized Resources (PCFS Score 3-4)

Individualized, multidisciplinary care designed to meet the unique needs of an individual.

Long COVID Patient Services

This tool is available within some clinical documentation systems or as a paper form: Post COVID-19 Functional Status Scale and Post COVID-19 Symptom Checklist (albertahealthservices.ca)

Appendix B:

Adult: Screening Tool for Post COVID Physical Sequelae

<table>
<tr><th>IMPAIRMENT</th><th>SCREENING QUESTIONS</th><th>OUTCOME</th></tr>
<tr>
<td>Post Exertional Symptom Exacerbation (PESE)</td>
<td>
<u>DePaul Symptom Questionnaire Post Exertional Malaise subscale (DSQ-PEM):</u>
“For each symptom below, please circle one number for frequency and one number for severity” (complete left to right)
<table>
<tr><th>Symptoms</th><th>Frequency:
Throughout the <u>past 6 months</u>, how <u>often</u> 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>Severity:
Throughout the <u>past 6 months</u>, how <u>much</u> 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>
<tr><td>1. Dead, heavy feeling after starting to exercise</td><td>0 1 2 3 4</td><td>0 1 2 3 4</td></tr>
<tr><td>2. Next day soreness or fatigue after non-strenuous, everyday activities</td><td>0 1 2 3 4</td><td>0 1 2 3 4</td></tr>
<tr><td>3. Mentally tired after the slightest effort</td><td>0 1 2 3 4</td><td>0 1 2 3 4</td></tr>
<tr><td>4. Minimum exercise makes you physically tired</td><td>0 1 2 3 4</td><td>0 1 2 3 4</td></tr>
<tr><td>5. Physically drained or sick after mild activity</td><td>0 1 2 3 4</td><td>0 1 2 3 4</td></tr>
</table>
<u>DSQ-PEM Scoring</u>
• Items 1–5: A frequency and severity score of ≥ “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
Optional Questions (if positive for PESE):
“For each question below, choose the answer which best describes your PESE symptoms.”
<table>
<tr><td>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>☐ Yes ☐ No</td></tr>
<tr><td>7. Do you experience a worsening of your fatigue/energy related illness after engaging in minimal physical effort?</td><td>☐ Yes ☐ No</td></tr>
<tr><td>8. Do you experience a worsening of your fatigue/energy related illness after engaging in mental effort?</td><td>☐ Yes ☐ No</td></tr>
<tr><td>9. If you feel worse after activities, how long does this last?</td><td>≤1h 2-3h 4-10h
11-13h 14-23h ≥24h</td></tr>
<tr><td>10. If you do not exercise, is it because exercise makes your symptoms worse?</td><td>☐ Yes ☐ No</td></tr>
</table>
</td>
<td>
<u>Positive for PESE</u>
• 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

<u>Negative for PESE</u>
• Proceed with graded exercise.
• PESE can occur at any time. Continue to monitor symptoms and re-screen as appropriate
</td>
</tr>
<tr>
<td>Cardiac Symptoms
*Consider recent medical clearance, baseline status and/or pre-existing conditions when determining if patient requires</td>
<td>
“<u>Since your symptoms of COVID-19”</u>…
1)…can you feel your heart racing with simple activities?
☐ Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse

2)…are you experiencing palpitations?”
☐ Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse
</td>
<td>If new or worsening and has not been assessed by a physician or nurse practitioner, consider referral back to primary care physician or specialist for</td>
</tr>
</table>

<table>
<tr><th>IMPAIRMENT</th><th>SCREENING QUESTIONS</th><th>OUTCOME</th></tr>
<tr><td>further medical investigation.</td><td>3)…do you have chest pain at rest?”
☐ Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse

4)…do you have chest pain with activity?”
☐ Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse</td><td>further cardiac investigation.</td></tr>
<tr><td>Significant Dyspnea

*Consider recent medical clearance, baseline status and/or pre-existing conditions when determining if patient requires further medical investigation.</td><td>Modified MRC Breathlessness Scale
(Select only one option among the five possible choices that describes your breathlessness related to activities.)<table><tr><td>Grade</td><td>Degree of breathlessness related to activities</td></tr><tr><td>0</td><td>Not troubled by breathlessness except with strenuous exercise</td></tr><tr><td>1</td><td>Troubled by shortness of breath when hurrying or walking up a slight hill</td></tr><tr><td>2</td><td>Walks slower than people of the same age because of breathlessness or has to stop for breath when walking at own pace on a level grade</td></tr><tr><td>3</td><td>Stops for breath after waling about 100m or after a few minutes on a level grade</td></tr><tr><td>4</td><td>Too breathless to leave the house, or breathless when dressing or undressing</td></tr></table></td><td>Score of 4: Refer back to primary care physician for further investigation (i.e. PFT, chest x-ray, etc.).

Score of ≤ 3: Proceed with assessment for exertional oxygen desaturation.</td></tr>
<tr><td>Exertional Oxygen Desaturation

*Consider recent medical clearance, baseline status and/or pre-existing conditions when determining if patient requires further medical investigation.</td><td>To assess for exertional oxygen desaturation, the PT involved should complete one of the following tests:
*Submaximal testing should not be completed with patients who screen positive for post exertional symptom exacerbation, consider informal assessment. Terminate testing if exertional oxygen desaturation is observed.

• 1 Minute Sit to Stand Test
• 2 Minute Step Test
• 6 Minute Walk Test (6MWT)

Note: Oxygen saturation (SpO2) should be monitored throughout test and for at least 1 minute post.

Exertional Oxygen Desaturation = SpO2 drops ≥5% <u>or</u> below 90% for patients without known lung pathology (88% for those with known lung pathology).</td><td><u>Positive Screen</u>
Refer to primary care physician for further investigation. If medically cleared continue with pacing.

<u>Negative Screen</u>
Exertional oxygen desaturation can occur at any time. Continue to monitor symptoms and re-screen as appropriate.</td></tr>
<tr><td>Dysautonomia

*Consider recent medical clearance, baseline status and/or pre-existing conditions when determining if patient requires further medical investigation.</td><td>“<u>Since your symptoms of COVID-19”</u>…
1)…do you feel lightheaded after you change position?
☐ Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse

2)…do you feel unwell when sitting upright or standing?
☐ Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse

If new or worsening to <u>either</u> question, complete the Active Stand Test to screen for orthostatic hypotension (OH) or postural orthostatic tachycardia syndrome (POTS).

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.

• 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 AND orthostatic symptoms.</td><td>If patient screens positive for OH, provide education and proceed with symptom titrated activity and exercise.

If patient screens positive for POTS, refer back to primary care physician for further investigation.</td></tr>
</table>

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Appendix C:

Pediatric: Screening Tool for Post COVID Physical Sequelae

<table>
<tr><th>IMPAIRMENT</th><th>SCREENING QUESTIONS</th><th>OUTCOME</th></tr>
<tr><td>Post Exertional Symptom Exacerbation (PESE)</td><td>
<u>DePaul Symptom Questionnaire Pediatric (DSQ-PED)</u> Modified with permission
“For each question below, please circle one number for ‘how often’ and one number for how much’” (complete left to right)
<table>
<tr><th>Symptoms</th><th>Frequency:
Throughout the <u>past 3 months</u>, how <u>often</u> have you had this symptom? For each question 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>Severity:
Throughout the <u>past 3 months</u>, how <u>much</u> has this question bothered you? For each symptom listed below, circle a number:
0 = no problem
1 = small problem
2 = medium problem
3 = big problem
4 = very big problem</th></tr>
<tr><td>1. Your body feels heavy after starting to exercise. (ie sports or playing outdoors)</td><td>0 1 2 3 4</td><td>0 1 2 3 4</td></tr>
<tr><td>2. Feeling sore or very tired after everyday activities like walking around your house.</td><td>0 1 2 3 4</td><td>0 1 2 3 4</td></tr>
<tr><td>3. Your mind is tired after just a little effort (ie it’s hard to make choices or think)</td><td>0 1 2 3 4</td><td>0 1 2 3 4</td></tr>
<tr><td>4. A little bit of exercise makes your body tired.(ie – recess on the swings)</td><td>0 1 2 3 4</td><td>0 1 2 3 4</td></tr>
<tr><td>5. Your body is tired or you feel sick after a little bit of activity. (ie playing video games or walking in the school hallway)</td><td>0 1 2 3 4</td><td>0 1 2 3 4</td></tr>
</table>
<u>DSQ-PED Scoring Modified Scoring</u>
• Items 1–5: A frequency and severity score of ≥ “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
Optional Questions (if positive for PESE):
“For each question below, choose the answer which best describes your PESE symptoms.”
<table>
<tr><td>6. If you rest, does all of your tiredness go away?</td><td>☐ Yes ☐ No</td></tr>
<tr><td>7. Does your tiredness get worse after a little physical activity?</td><td>☐ Yes ☐ No</td></tr>
<tr><td>8. Does your tiredness get worse after thinking (ie doing school)</td><td>☐ Yes ☐ No</td></tr>
<tr><td>9. If you feel worse after activities, how long does this last?</td><td>≤1h 2-3h 4-10h 11-13h 14-23h ≥24h</td></tr>
<tr><td>10. Do you limit or cut back activity to avoid feeling even more tired?</td><td>☐ Yes ☐ No</td></tr>
</table>
</td><td>
<u>Positive for PESE</u>
• 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

<u>Negative for PESE</u>
• Proceed with graded exercise.
• PESE can occur at any time. Continue to monitor symptoms and re-screen as appropriate
</td></tr>
<tr><td>Cardiac Symptoms
*Consider recent medical clearance, baseline status and/or</td><td>“<u>Since your symptoms of COVID-19”</u>…

1)…can you feel your heart racing when playing with your friends?
☐ Never/Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse</td><td>If new or worsening symptoms and has not been assessed by a physician or nurse practitioner, consider</td></tr>
</table>

<table>
<tr><th>IMPAIRMENT</th><th>SCREENING QUESTIONS</th><th>OUTCOME</th></tr>
<tr><td>pre-existing conditions when determining if patient requires further medical investigation.

Medication use (e.g. inhalers, oral medication) prior to, or during assessment will impact results.

Normal Heart rate for children over 6 years: mean 75 beats/min range 60-90 (Pryor & Prasad 2008)</td><td>2)…can you feel your heart beating fast?
☐ Never/Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse
3)…does your chest hurt when you are sitting or lying down?
☐ Never/Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse
4)…does your chest hurt when you are playing at the playground or playing sports?
☐ Never/Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse
5)…do you feel sick to your stomach when you are playing at the playground or playing sports?
☐ Never/Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse
6)…do your legs hurt when you are playing at the playground or playing sports?
☐ Never/Absent ☐ Pre-existing: same ☐ Pre-existing: worse
☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse</td><td>referral back to primary care physician, pediatrician or specialist for further cardiac investigation.</td></tr>
<tr><td>Significant Dyspnea

*Consider recent medical clearance, baseline status and/or pre-existing conditions when determining if patient requires further medical investigation.

Medication use (e.g. inhalers, oral medication) prior to, or during assessment will impact results.

Normal Respiratory rate for children over 6 years 15-30 breaths/min (Pryor & Prasad 2008)</td><td>Youth ages 12 years and up:
Modified MRC Breathlessness Scale
(Select only one option among the five possible choices that describes your breathlessness related to activities.)<table><tr><td>Grade</td><td>Degree of breathlessness related to activities</td></tr><tr><td>0</td><td>Not troubled by breathlessness except with strenuous exercise</td></tr><tr><td>1</td><td>Troubled by shortness of breath when hurrying or walking up a slight hill</td></tr><tr><td>2</td><td>Walks slower than people of the same age because of breathlessness or has to stop for breath when walking at own pace on a level grade</td></tr><tr><td>3</td><td>Stops for breath after waling about 100m or after a few minutes on a level grade</td></tr><tr><td>4</td><td>Too breathless to leave the house, or breathless when dressing or undressing</td></tr></table></td><td>Score of 4: Refer back to primary care physician for further investigation (i.e. PFT, chest x-ray, etc.).

Score of ≤ 3: Proceed with assessment for exertional oxygen desaturation.</td></tr>
<tr><td></td><td>Children under age 12:
Consider the following questions, children can respond using the Pediatric BORG Scale (range 0-10) with faces.
1. How do you feel after playing tag with your friends?
2. How do you feel after hurrying or walking up a slight hill?
3. How do you feel after walking the length of the school yard?
NOTE: the BORG should be completed by the child – based on their perception.</td><td>BORG of 3 or higher on questions 2 and 3
Refer back to primary care physician for further investigation (i.e. PFT, chest x-ray, etc.).

Score of less than 3 proceed with assessment for exertional oxygen desaturation.</td></tr>
<tr><td>Exertional Oxygen Desaturation

*Consider recent medical clearance, baseline status and/or pre-existing conditions when determining if patient requires further medical investigation.</td><td>To assess for exertional oxygen desaturation, the PT involved should complete the 6 minute walk test (6MW with children ages 5 years and up).
*Submaximal testing should not be completed with patients who screen positive for post exertional symptom exacerbation, consider informal assessment. Terminate testing if exertional oxygen desaturation is observed.

Note: Oxygen saturation (SpO2) should be monitored for the 10 minutes prior to the test, throughout test and for the duration of posttest vital assessment (6 minutes).</td><td><u>Positive Screen</u>
Refer to primary care physician for further investigation. If medically cleared continue with pacing.

<u>Negative Screen</u>
Exertional oxygen desaturation can occur at any time. Continue to monitor</td></tr>
</table>

IMPAIRMENT	SCREENING QUESTIONS	OUTCOME
Normal Respiratory rate for children over 6 years 15-30 breaths/min (Pryor & Prasad 2008)	**Exertional Oxygen Desaturation =** SpO2 drops ≥5% from pre-test baseline **<u>or</u>** below 92%.	symptoms and re-screen as appropriate**.**
Dysautonomia *Consider recent medical clearance, baseline status and/or pre-existing conditions when determining if patient requires further medical investigation. Medication use (e.g. inhalers, oral medication) prior to, or during assessment will impact results. Normal Blood pressure for children over 6 years systolic/diastolic 97-112/57-71 mmHg (Pryor & Prasad 2008)	"***<u>Since your symptoms of COVID-19</u>***"… 1)*…do you feel lightheaded or dizzy after you sit up when you were laying down or after you stand up when you were sitting?* ☐ Never/Absent ☐ Pre-existing: same ☐ Pre-existing: worse ☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse 2)*…do you feel unwell when sitting upright or standing?* ☐ Never/Absent ☐ Pre-existing: same ☐ Pre-existing: worse ☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse 2)*…have you ever lost consciousness with a position change?* ☐ Never/Absent ☐ Pre-existing: same ☐ Pre-existing: worse ☐ New since COVID-19: Stable/improving ☐ New since COVID-19: worse If **"Yes"** to <u>any</u> question, complete the **Active Stand Test** to screen for orthostatic hypotension (OH) or postural orthostatic tachycardia syndrome (POTS). 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. • **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 ≥ 40 bpm from baseline or ≥ 120 bpm, in the first 10 minutes of being in an upright position AND orthostatic symptoms.	If patient screens **positive for OH**, provide education and proceed with symptom titrated activity and exercise. If patient screens **positive for POTS**, refer back to primary care physician for further investigation.

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