

# Clinical practice guide for assessment and management of adults with post-acute sequelae of COVID-19

## Guidance for NSW health clinicians

This clinical practice guide is intended for use by clinicians in primary health networks and local health districts, as well as primary care practitioners across NSW who provide care to adults aged 16 years and older with a history of COVID-19 diagnosis, regardless of severity or COVID-19 variant of concern.

### Contents

Intended audience and application	2
Background	2
Methodology	3
Common symptoms of post-acute COVID-19 sequelae	4
Comprehensive patient assessment	4
Patient reported outcome measures	4
Symptoms	6
Red flags	8
Glossary	21
Acknowledgements	22
Appendix A - Recommended services and clinicians for the establishment of a dedicated PASC clinic	23
References	24

### Definition of 'post-acute sequelae of COVID-19'

Post-acute sequelae of COVID-19 (PASC), also referred to as 'post-acute COVID-19 condition', 'post COVID-19 syndrome' or colloquially as 'long COVID' is defined by the World Health Organization as:

"the condition that occurs in individuals with a history of probable or confirmed SARS CoV-2 infection, usually:

- **three** months from the onset of COVID-19; **AND**
- with symptoms that last for at least **two** months and cannot be explained by an alternative diagnosis" [emphasis added].<sup>1</sup>

Note that both of these criteria are required.

The World Health Organization states "common symptoms include fatigue, shortness of breath, cognitive dysfunction but also others and generally have an impact on everyday functioning. Symptoms may be onset following initial illness. Symptoms may also fluctuate or relapse over time".<sup>1</sup>

## Intended audience and application

This clinical practice guide is intended for use by clinicians in primary health networks and local health districts, as well as primary care practitioners across NSW who provide care to adults aged 16 years and older with a history of COVID-19 diagnosis, regardless of severity or COVID-19 variant of concern. People may initially present to emergency departments, specialist post-COVID-19 clinics, specialist services (e.g. rehabilitation or respiratory medicine), primary care or general practices with ongoing symptoms that require further assessment, investigation, management and/or referral.

This guide is designed to minimise the risk of fragmented delivery of care, avoid potential over-investigation and overtreatment, and identify people who would benefit from further assessment and management. People should be referred to the most appropriate clinic, service, or clinician for management of their unique set of symptoms and personal circumstances.

This information is not a substitute for healthcare providers' professional judgment and is intended to provide additional guidance for the assessment and management of PASC after usual clinical assessment and care. Specific information about the individual patient and consultation with other medical specialties must be considered as appropriate.

**It is important to note that the evidence base on the assessment and management of PASC continues to evolve. This document represents a living document that will continue to be updated in line with emerging evidence.**

## HealthPathways

This guide is consistent with the HealthPathway Post COVID-19 Conditions and the Royal Australian College of General Practitioners document [Caring for patients with post-COVID-19 conditions](#).<sup>2</sup> The HealthPathway was originally developed in 2020 in collaboration with the NSW COVID-19 Rehabilitation Community of Practice. It has been adopted with local adaptation in most primary health networks across NSW for use by general practitioners and practice nurses.

## Background

At the time of writing, current evidence suggests approximately 10-20% of people experience a variety of mid and long-term effects after they recover from their acute COVID infection.<sup>3</sup> The prevalence of PASC in those infected with the Omicron variant, first detected in South Africa in November 2021, remains uncertain with studies ongoing.

Common symptoms are listed in Table 1. Significant physical, psychological and cognitive impairments may persist despite clinical resolution of the infection.<sup>4-6</sup>

The recommended management and model of care for people diagnosed with COVID-19 in the first 12 weeks post-diagnosis is outlined in the NSW Health document [Management of adults with COVID-19 in the post-acute phase – a model of care for NSW Health clinicians](#).<sup>7</sup> This guide represents an evolution of that model of care, covering the ten most frequently reported symptoms of PASC in currently available peer-reviewed evidence.

**This document is not intended to provide a prescriptive model of care. Instead, this guide provides advice to clinicians on various assessment tools, management strategies and indicators for referral for people experiencing symptoms.**

## The effect of vaccination on prevalence of symptoms

International evidence suggests the incidence and severity of PASC is reduced when patients have received COVID-19 vaccination. A study from the United Kingdom of 1.2 million adults found the odds of having COVID-19 symptoms 28 days or more post-infection was halved by having two vaccine doses.<sup>8</sup> A similar study in the United States found patients who received at least one vaccine dose prior to their diagnosis with COVID-19 were 7-10 times less likely to report two or more PASC symptoms, compared to unvaccinated patients.<sup>9</sup>

## Models of care

As highlighted above, this guide is not intended to provide a model of care. This clinical practice guide is designed to minimise the risk of fragmented delivery of care, avoid potential over-investigation and overtreatment, and identify people who would benefit from further assessment and management.

Assessment and management of PASC symptoms requires a comprehensive assessment that balances the need for appropriate assessment and management, while limiting unnecessary investigations. The challenge is to determine who would benefit from further investigations and specialist involvement. People should be referred to the most appropriate clinic, service or clinician for management of their unique set of symptoms and personal circumstances.

Many patients will have multiple symptoms and a multi-specialty or multidisciplinary approach may be required to ensure integrated, consistent, and appropriate care while avoiding unnecessary interventions and overtreatment.

Districts and networks may support care of people with PASC in a range of ways, including:

- Referrals to a person's general practitioner, providing escalation pathways for referrals back to specialist services as required
- Access to care through existing services, such as integrated or chronic care teams
- Establishment of PASC clinics to provide this holistic, multidisciplinary, integrated approach

Those people who were treated in intensive care units (ICUs), those who have required high levels of respiratory support or suffered complications, such as sepsis or thromboembolism, are more likely to require access to multidisciplinary PASC clinics. The initial follow-up for people who have been diagnosed with moderate to severe COVID-19 is defined and further outlined in [Management of adults with COVID-19 in the post-acute phase – a model of care for NSW Health clinicians](#), the scope of which is limited to the first 12 weeks post-diagnosis.<sup>7</sup>

Appendix A contains a list of recommended services and clinicians for the establishment of a dedicated PASC clinic.

Regardless of the model of care used, emphasis should be based on comprehensive patient assessment, including physical, cognitive, psychosocial and psychological assessment with multidisciplinary input. Taking a shared decision-making approach will support consistent care delivery and foster self-management.<sup>10</sup>

**As people with PASC are likely to present to their general practitioner (or primary care provider) in the first instance, a well-integrated and supportive model of care underpinned by involving and communicating with general practitioners is required.**

## Methodology

This guide is based on current evidence and informed by expert clinical consensus of a team of senior clinicians from the following disciplines: multidisciplinary rehabilitation, respiratory medicine, primary care, general practice, geriatric medicine, psychiatry, cardiology, and allied health disciplines including occupational therapy, physiotherapy and psychology.

The document has been informed by the work of the NSW COVID-19 Critical Intelligence Unit including:

- [Living evidence table – post acute sequelae of COVID-19](#)<sup>11</sup>
- [Post-acute sequelae SARS-CoV-2 evidence check](#)<sup>12</sup>
- [Post-acute and sub-acute COVID-19 care evidence check](#)<sup>13</sup>
- [Breathlessness post COVID-19](#)<sup>14</sup>

**It is important to note that the evidence base on the assessment and management of PASC continues to evolve. This document represents a living document that will continue to be updated in line with emerging evidence.**

## Common symptoms of post-acute COVID-19 sequelae

There are a number of factors associated with an increased risk of PASC:

- Hospitalisation or severity of symptoms during the acute phase of illness
- Age over 65
- Pre-existing comorbidities particularly asthma, cardiovascular disease, diabetes and dementia
- Frailty (assessed by use of the [clinical frailty scale](#))<sup>15</sup>
- Moderate to severe obesity, measured as a body mass index greater than or equal to 30
- COVID-19 vaccination status at the time of acute illness
- Increase of inflammatory markers (from baseline) during primary infection
- Female sex<sup>16-18</sup>

The mechanisms that lead to PASC are still poorly understood and are under ongoing study – these mechanisms may be singular or multifactorial. Possible causes include organ dysfunction as a consequence of the acute illness, a persistent hyper-inflammatory state, cerebrovascular disease, cerebral hypoxia, adverse effects of medications, such as sedatives or neuromuscular blockade, physical deconditioning, pre-existing comorbidities and psychological sequelae.<sup>19</sup> Symptoms may fluctuate and change in nature over time.<sup>10</sup>

## Comprehensive patient assessment

Regardless of the care setting in which a person presents with PASC, a holistic, person-centred approach to patient assessment is required. A comprehensive clinical history and appropriate examination should include:

- History of acute COVID-19 (suspected or confirmed)
- The nature and severity of previous and current symptoms
  - This should include documentation of objective markers of disease severity such as requirement for ICU admission, ICU and hospital length of stay (if applicable), the use of invasive or non-

invasive ventilation or extracorporeal membrane oxygenation, arterial or venous thromboembolic complications, sepsis and any opportunistic infections in context of immunomodulators

- Timing and duration of symptoms since the onset of acute COVID-19 illness
- History of other health conditions
- Exacerbation of pre-existing conditions
- Social determinants of health assessment (e.g. interpersonal connections, work, finances and lifestyle factors)
- COVID-19 vaccination status

It may assist for a family member, carer, or trusted friend to support the patient in this assessment.

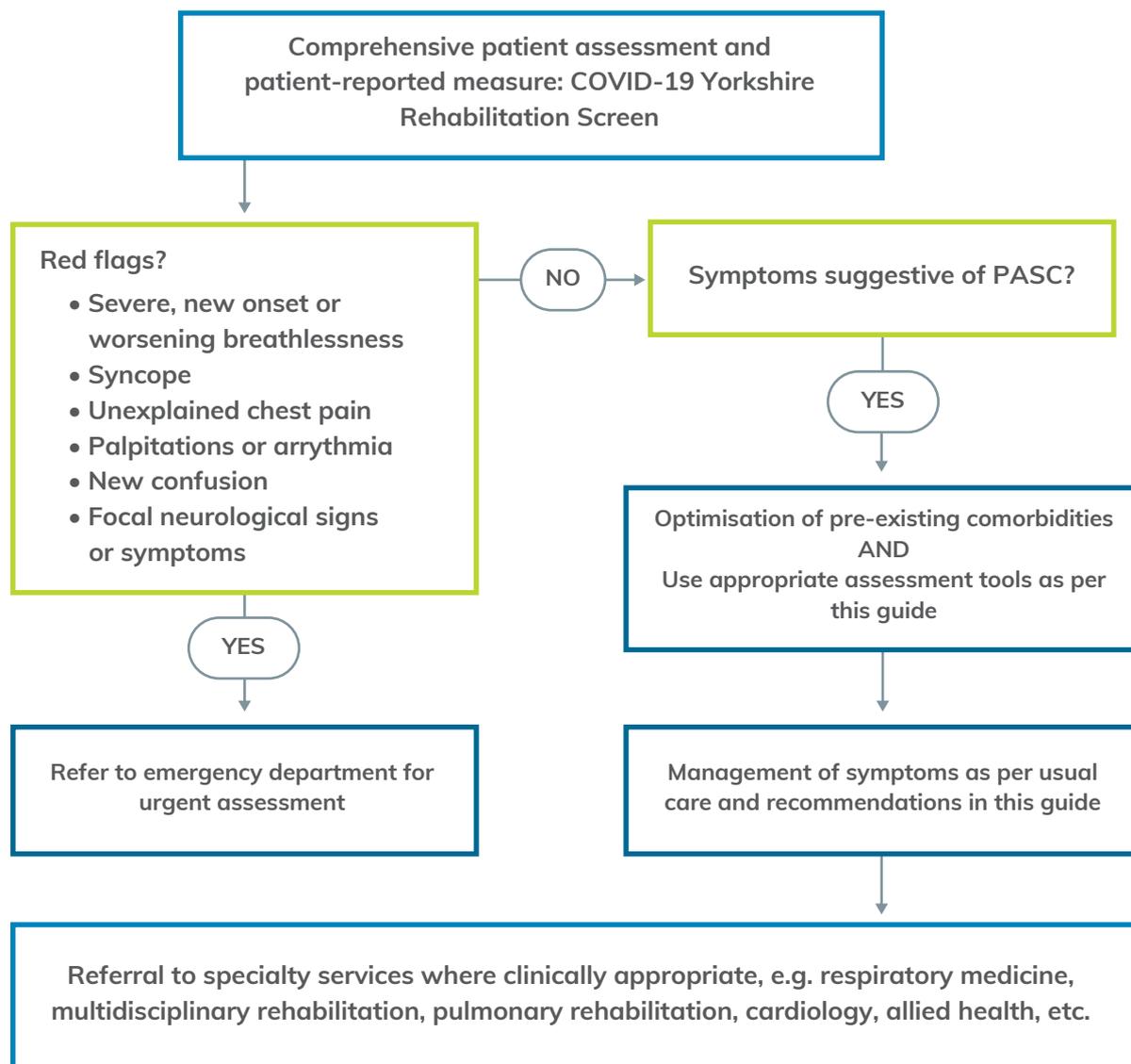
## Patient-reported outcome measures

An important part of the patient assessment is measuring the severity and impact of the symptoms on a person's level of functioning and degree of impairment experienced. For example, does the person have reduced exercise tolerance, are they needing to frequently access health services, are they able to return to work, is their quality of life impacted?

There are a number of patient-reported outcome measures that may be used as part of this assessment, including the COVID-19 Yorkshire Rehabilitation Scale (C19-YRS), Patient-Reported Outcomes Measurement Information System (PROMIS-29<sup>®</sup>) and the EQ-5D-5L.<sup>20-22</sup> The C19-YRS screens for the most common symptoms of PASC and grades the severity of symptoms to provide a score of burden, functional disability, and global health. These scores provide the clinician information on the most burdensome of symptoms so that they can focus on what matters most to the patient. They also provide a reference point which allows the patient to focus on self-reported symptoms and demonstrate progress.

The C19-YRS is recommended for use in the HealthPathway for post-COVID-19 conditions and is being incorporated into the NSW Health Outcomes and Patient Experience (HOPE) platform for patient reported measures for use by both NSW Health clinicians as well as primary care. At the time of writing, the C19-YRS is the only validated patient reported outcome tool for assessment of symptoms of PASC.

Figure 1: Guide to patient assessment for symptoms of PASC



## Symptoms

Table 1 outlines the most commonly reported symptoms of PASC.

**Table 1: Most commonly reported symptoms of PASC<sup>10</sup>**

Symptoms or signs	
Respiratory	<a href="#">Breathlessness</a> <a href="#">Cough</a>
Cardiovascular	Chest tightness <a href="#">Chest pain</a> <a href="#">Palpitations</a> Postural hypotension Postural orthostatic tachycardia syndrome (POTS)
General	<a href="#">Fatigue</a> Fever Pain
Neurological	Autonomic dysfunction <a href="#">Cognitive impairment</a> ('brain fog', loss of concentration or memory issues) Delirium (especially in older populations) Dizziness Headache <a href="#">Mobility impairment</a> Peripheral neuropathy symptoms including neuropathic pain Sleep disturbance (independent of symptoms of depression based on alteration of circadian rhythm) Visual disturbance
Gastrointestinal	Abdominal pain Diarrhoea Nausea and vomiting Weight loss and reduced appetite
Musculoskeletal	<a href="#">Joint pain</a> <a href="#">Muscle pain</a>
Ear, nose and throat	Dysphagia Dysphonia Earache <a href="#">Loss of taste and/or smell</a> Nasal congestion Sore throat Tinnitus Vertigo

Dermatological	Hair loss Skin rashes
Psychological or psychiatric	<a href="#">Anxiety</a> <a href="#">Depression</a> <a href="#">Post-traumatic stress disorder</a>

For the purposes of this clinical practice guide, the ten most reported symptoms will be explored in further detail.

These are (in no particular order\*):

- Fatigue
- Breathlessness
- Cough
- Depression and anxiety (noting that these are two distinct symptoms which have been grouped for the purpose of this guide)
- Post-traumatic stress disorder (PTSD)
- Cognitive impairment ('brain fog')
- Joint and muscle pain
- Functional mobility impairment
- Palpitations and chest pain
- Altered sense of taste and/or smell

\*The reported prevalence of symptoms varies between different research studies hence the symptoms are listed in no particular order; noting that fatigue and breathlessness generally have the highest reported rates of prevalence.

## Red flags

**The following symptoms are red flags. Patients presenting with any of these symptoms should be referred to their local emergency department for urgent assessment and treatment.**

- ▶ **Focal neurological signs or symptoms**
- ▶ **New confusion**
- ▶ **Palpitations or arrhythmia**
- ▶ **Severe, new onset or worsening breathlessness**
- ▶ **Syncope**
- ▶ **Unexplained chest pain**

## Fatigue

Fatigue should not be assessed in isolation. Persistent fatigue is the most common long-term issue facing survivors of COVID-19.<sup>23</sup> Fatigue post COVID-19 may represent typical deconditioning associated with illness or specific post-viral fatigue, or a mix of both. It may be difficult to distinguish between the two.

Post-viral fatigue is usually self-limiting, resolving within several months, but the risk of its chronicity is associated with biological, social, behavioural, cognitive and emotional factors.<sup>24</sup> This fatigue has been compared to other post-viral illnesses such as myalgic encephalomyelitis or chronic fatigue syndrome (ME/CFS). Females and people with a pre-existing diagnosis of depression and/or anxiety are overrepresented in patients with long-term fatigue.<sup>25</sup>

For some people, post COVID-19 fatigue can be debilitating, affecting their ability to work, look after children or study. A particular aspect of this appears to be post-exertional fatigue which poses challenges to treatment. The clinicians treating patients experiencing fatigue should validate and empathise with the patient's suffering and adopt a biopsychosocial model for management. A supportive and experienced team validating and empathising with the patient's experience is paramount.<sup>24</sup>

### Assessment

Post-COVID-19 fatigue is often associated with respiratory symptoms including shortness of breath and cough. The management of shortness of breath and cough is covered in more detail below.

Assessment of the pattern and character of fatigue is required to exclude other diagnoses, such as depression, anxiety, drug or substance abuse and sleep disturbance. The assessment should consider other potential factors leading to fatigue and loss of motivation. The impact of fatigue on the patient's life, function and activities, such as work, education, mobility and independence, should be explored.<sup>10</sup>

Investigations for fatigue to rule out any secondary causes may include routine haematology and biochemistry, including full blood count, iron studies, urea and electrolytes, thyroid function tests, liver function tests, bone profile, erythrocyte sedimentation rate, C-reactive protein and vitamin B12 measures.<sup>26</sup> Early morning serum cortisol and a nutritional profile may also be indicated, particularly if dietary history is suggestive of issues and/or no other abnormalities are detected via routine pathology.<sup>27</sup>

Where the presence of any secondary cause of fatigue has been excluded, a validated scale or tool may be used to assess and monitor symptoms of fatigue. These can aid in assessing progress and response to treatment. Suitable tools include:

- [Fatigue Severity Scale \(FSS\)](#)<sup>28</sup>
- [PROMIS-29 \(fatigue questions 13-16\)](#)<sup>21</sup>
- [Brief Fatigue Inventory](#)<sup>29</sup>

In those with a history of daytime sleepiness, establish a sleep history and screen for sleep apnoea.<sup>30</sup> If at high risk for sleep apnoea, the person should be referred for polysomnography.

### Management

The evidence on appropriate management of post-COVID-19 fatigue is still emerging. Management of fatigue associated with similar conditions, such as ME/CFS may be useful in managing COVID-19 fatigue and includes the following:

- Provide patient education, particularly on the pattern and behaviour of the disease (and its recovery) to set realistic goals and timelines for return to baseline function. Fatigue associated with deconditioning is likely to require a period of convalescence, particularly for those people who experienced more severe symptoms of acute COVID-19 (including those treated in ICU). The concept of post-exertional symptoms should be explained carefully to patients to prevent over-exertion.

- Treat any underlying or comorbid conditions that may enhance symptoms of fatigue, for example depression. This should include an exploration of the person's interpersonal context.
- People experiencing fatigue and deconditioning after a long hospital stay will benefit from a supervised rehabilitation program and should be referred to local rehabilitation services. A multidisciplinary rehabilitation team will include a rehabilitation physician, allied health clinicians (including physiotherapy, occupational therapy, social work, psychology, speech pathology, dietetics as required) and nurses. Older people may benefit from review in multidisciplinary geriatric medicine clinics. People who are experiencing ongoing respiratory symptoms in addition to deconditioning should be referred to their local pulmonary rehabilitation service. Further detail on pulmonary rehabilitation is provided below.
- Support patients in discussions with their employer or educational institutions about a phased return to work or education.<sup>10</sup>
- Assist patient to set a baseline for activities that do not exacerbate symptoms and energy conservation and pacing strategies. A graded return to activity is recommended, however this should be self-paced rather than imposed by the clinician to prevent post-exertion malaise.<sup>31</sup> Referral to an occupational therapist may be appropriate.
- Provide advice for improving quality of rest, sleep hygiene and nutrition to help improve energy levels. For those also experiencing weight loss and/or poor appetite, referral to a dietitian may be required. Sedatives should be avoided as they rarely improve the quality of sleep.<sup>24</sup>
- Cognitive behaviour therapy has also been shown to be beneficial in reducing fatigue. Patients should be referred to a clinical psychologist or neuropsychologist.<sup>32</sup>

The [University of New South Wales Fatigue Clinic](#) provides evidence-based, multidisciplinary healthcare for people living with fatigue conditions, including post-infective fatigue syndrome. The clinic's website contains good advice for consumers and health professionals on the recommended management of fatigue.<sup>33</sup>

## Breathlessness

- ▶ **Severe, new onset or worsening breathlessness or chest pain – refer patient to the emergency department.**

People recovering from an acute COVID-19 illness who were admitted to hospital and required respiratory support, such as high flow oxygen, continuous positive airway pressure, or intubation, are at high risk of persistent exertional breathlessness and reduced exercise tolerance.<sup>34-37</sup> The severity of the acute COVID-19 infection and prior health status are the main determinants of persistent changes on chest imaging and impairment in lung function in PASC.

It is reported that between 14.2% and 37% (median 29.7%) of people experience ongoing breathlessness post-COVID-19 infection.<sup>38</sup> For some people breathlessness is continual. For others breathlessness on exertion may occur. Breathlessness is a complex perceptual experience and often does not directly correlate with measures of respiratory function but can still be debilitating.

Figure 2 outlines recommended assessment and management of persistent breathlessness post COVID-19.

### Assessment<sup>14, 39</sup>

The assessment of breathlessness should consider the severity of acute illness, acute complications and the respiratory support that was required during the acute illness, for example the use of mechanical or non-invasive ventilation. Review of a person's medical history should specifically include a review of comorbid cardiac and respiratory disease.

A formal assessment of the severity of a patient's breathlessness should be made.

## Assessment tools

### Dyspnoea-12 score

The Dyspnoea-12 (D12) is a global score of breathlessness severity that quantifies in terms of severity, physical and affective aspects of dyspnoea. It is validated in a variety of diseases.<sup>40</sup> In a recent study in the United Kingdom, self-reported D12 scores at follow-up were found to be more abnormal in those treated in ICU during acute COVID-19 illness.<sup>41</sup>

### Modified Medical Research Council Dyspnoea Scale

The Modified Medical Research Council Dyspnoea Scale assesses the degree of baseline functional disability due to breathlessness, and may also be used as a comparison for future assessments.<sup>42</sup>

### Modified 0-10 Borg Dyspnoea Scale

The Borg Dyspnoea Scale, while simpler to complete than the Modified Medical Research Council Dyspnoea Scale, is less responsive to assessing change as it is dependent on the activity a person is engaging in at the time of assessment. The Borg Dyspnoea Scale is usually used during or immediately after exercise as a measure of breathlessness.

## Persistent breathlessness

Persistent breathlessness eight weeks (or more) following COVID-19 illness should be assessed with:

- chest X-ray, which should be compared with previous CXRs where available
- spirometry
- diffusing capacity for carbon monoxide (DLCO) (a measurement of gas factor transfer).

Evidence has shown that spirometry is abnormal in only 10% of people with persistent breathlessness, and hence, all three tests should be performed.<sup>43</sup>

## Cardiac disease

Cardiac disease may present with worsening dyspnoea which may be accompanied by chest pain. Consider investigations such as an electrocardiogram and echocardiogram where clinically indicated, especially in those with a history of heart disease.

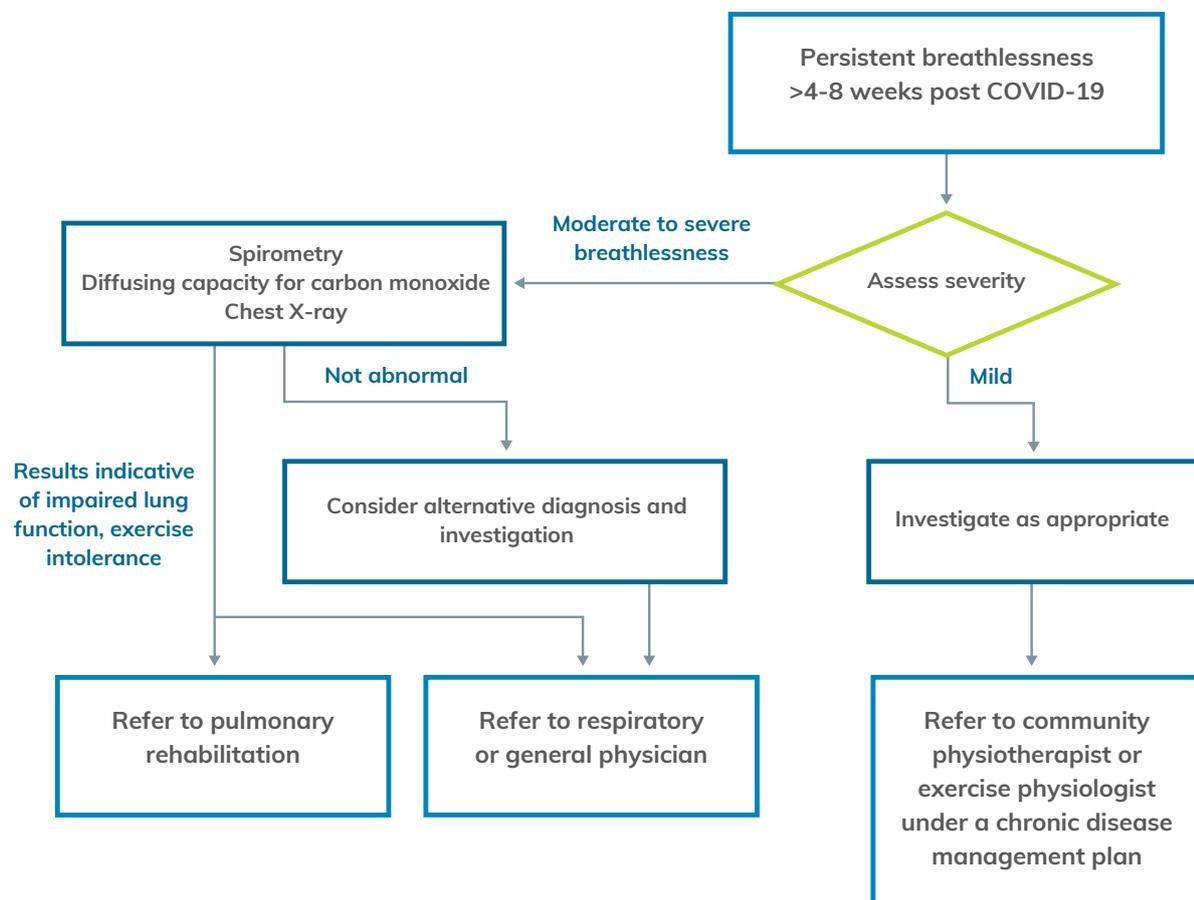
In those with persistent breathlessness, a measure of exercise tolerance should be made with a submaximal exercise test. These tests can be performed in some lung function laboratories, by physiotherapists and in pulmonary rehabilitation services. Relevant tests include:

- a six-minute walk test with continuous monitoring of oxygen saturation
- a rapid exertional desaturation test, for example one minute sit-to-stand test or 40 step test.<sup>44</sup> This test should only be performed if oxygen saturation at rest is greater than 95%. The test should be discontinued if the patient feels unwell. If oxygen saturation decreases by 3% or more, this is indicative of significant lung disease and the patient should be referred to respiratory medicine.

Refer patients with persistent breathlessness, abnormal CXR or lung function to respiratory physician or clinic. In those patients with worsening of breathlessness and infiltrates on CXR consider complicating cardiac failure, or the development of interstitial lung disease.

In those who present with new onset breathlessness, especially if associated with pleuritic chest or pain, calf swelling and pain, and no new changes on CXR, consider deep vein thrombosis (DVT) and pulmonary embolism (PE). A recent study has shown following COVID-19 illness, there was a greater than two-fold increased risk of DVT and PE.<sup>45</sup> Investigate for DVT and PE with a serum D-dimer; and if positive when adjusted for age, consider a CT pulmonary angiogram or ventilation perfusion lung scan.

Figure 2: Assessment and management of persistent breathlessness post COVID-19



## Management

### Persistent breathlessness

#### Referrals to respiratory medicine

Consider referral to respiratory medicine for all people with moderate to severe breathlessness that is limiting exercise tolerance and persistent for greater than four weeks following acute COVID 19 diagnosis. The referring clinician should perform appropriate initial investigations **before** referral (including spirometry, DLCO and a CXR).

A high-resolution CT scan of the chest should not be the first screening test to assess persistent breathlessness. Abnormalities on high resolution CT are more common in those hospitalised with acute lung disease.<sup>46</sup> They tend to improve with time, though may persist.<sup>47</sup> The importance of persistent findings on CT should be assessed in the context of symptoms and functional impairment. In those with evidence of interstitial lung disease (persistent radiographic changes, impaired spirometry or DLCO), refer to a respiratory physician for management.

#### Referrals to pulmonary rehabilitation

Where there is evidence of physiological pulmonary impairment and reduced exercise tolerance, especially in those that have been hospitalised for acute COVID-19, pulmonary rehabilitation has been shown to result in an improvement in exercise tolerance, health-related quality of life and symptoms.<sup>48</sup>

Following assessment at pulmonary rehabilitation and consultation with the person, an appropriate model of rehabilitation can be offered, for example gym-based, home-based or tele-rehabilitation, or hydrotherapy.

Pulmonary rehabilitation offers:

- exercise assessment, prescription, supervised exercise training and advice on the gradual return to exercise and physical activity
- education and techniques to manage breathlessness, such as paced breathing and breathing control. Education may also include management of fatigue, importance of exercise and physical activity, symptom management and monitoring, inhaler medication education (where applicable), smoking cessation, nutrition, psychological support, and managing cough and sputum.

Refer all people with moderate to severe persistent breathlessness, especially those with evidence of impaired lung function and exercise tolerance, and those with pre-existing chronic lung disease to the local pulmonary rehabilitation program. The program should review people experiencing ongoing breathlessness as soon as the referral is received. Some people may only need a short program while others, such as those who have had a long hospital or ICU stay, will need the full eight-week program. Advice on home-based exercise programs should be provided if people are placed on a waiting list.

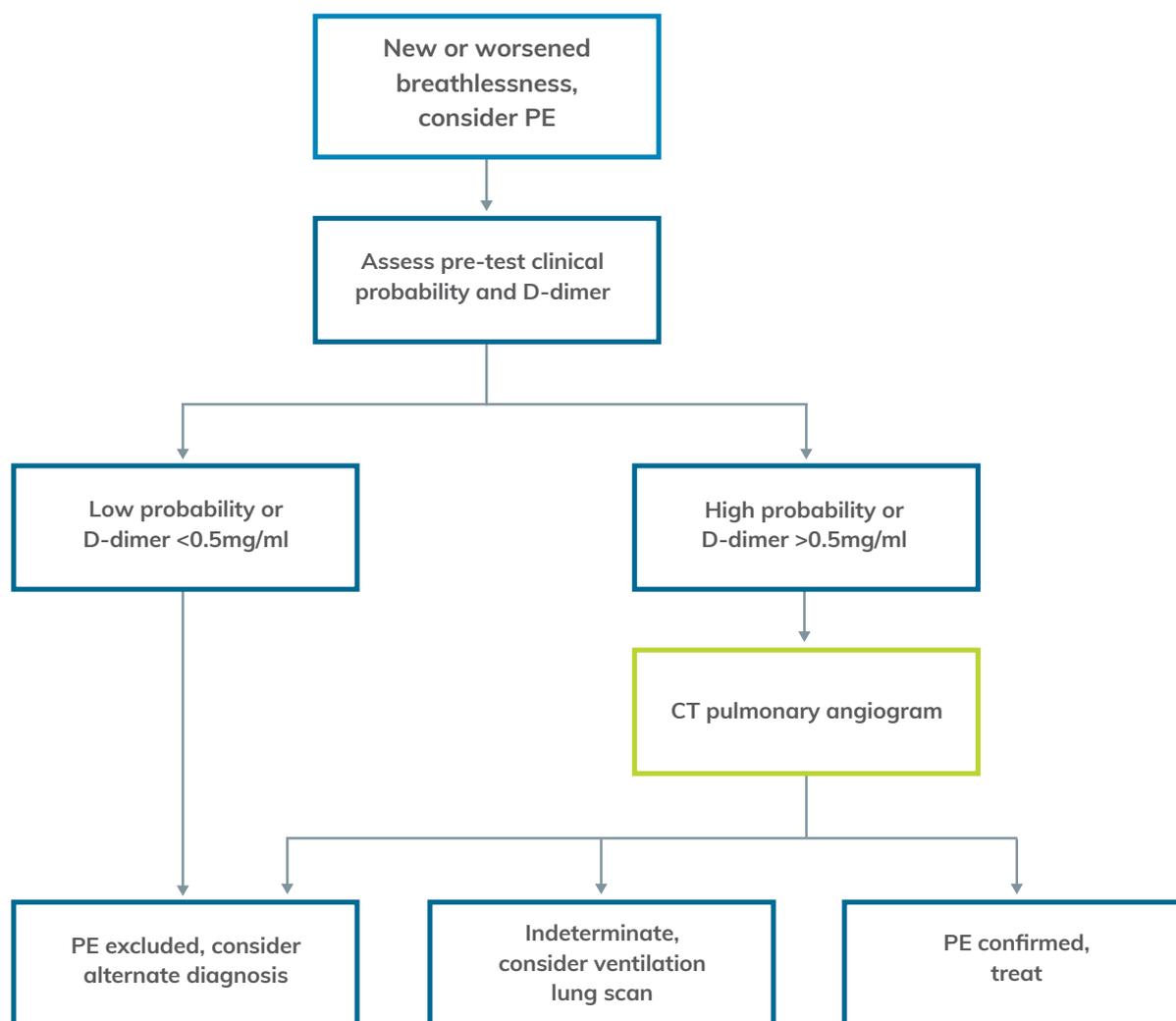
#### Referrals to community allied health practitioners

Refer people with mild impairment in exercise tolerance to a community physiotherapist or exercise physiologist under a chronic disease management plan. Note that a second allied health practitioner or specialist must also be included in this plan under the Medicare Benefits Schedule requirements for reimbursement. Alternatively, the person may be referred to a private rehabilitation provider if financial means exist.

## New onset or significantly worsening breathlessness – consideration of deep vein thrombosis and pulmonary embolism

► Severe, new onset or worsening breathlessness or chest pain – refer patient to the emergency department

Figure 3: Suspected deep vein thrombosis or pulmonary embolism post-COVID-19



For new onset or significantly worsening breathlessness, consider DVT or PE. The clinician should assess the clinical and pre-test probability of PE, use the Well’s Score Calculator and serum D-dimer and refer for CT pulmonary angiogram (CTPA) or lung perfusion and ventilation scan as appropriate.<sup>49</sup>

In those with new onset PE or DVT, commence treatment with appropriate anticoagulation. Refer as necessary to a haematologist, respiratory physician or general physician.

In those with suspected new onset angina, atrial fibrillation or cardiac failure, initiate treatment as appropriate and consider referral to a cardiologist.

## Cough

Persistent cough is common in the first few weeks following acute COVID-19 but is only present in 5 to 17% of people 12 weeks or more after the acute episode.<sup>50</sup>

### Assessment

▶ **Cough with coexisting symptoms, such as new-onset fever, dyspnoea or severe symptoms of asthma (e.g. wheeze) or severe breathlessness – refer patient to the emergency department.**

The assessment for persistent cough is similar to that described for breathlessness. The date of onset and characteristics of the cough should be confirmed. For most people, persistent cough is dry, irritating and non-productive, but if sputum is present, this should be further investigated.<sup>27</sup> Any co-existing symptoms should also be considered, particularly new-onset fever, dyspnoea or symptoms of asthma (e.g. wheeze) as they may indicate more urgent investigation is required.

There are several potential iatrogenic sequelae related to invasive procedures that may cause persistent cough. These include post-intubation orotracheal and post-tracheostomy irritation or sub-glottic stenosis.

The following assessments may be indicated for persistent cough:

- Spirometry – pre- and post-bronchodilator
- Fractional exhaled nitric oxide
- DLCO
- CXR<sup>51</sup>

### Management

The management of persistent cough will depend on assessment findings, particularly the presence of any pulmonary abnormalities.

In the absence of any specific pulmonary findings, persistent cough is managed in a similar fashion to cough in patients with post-viral cough syndrome.

### Referrals to respiratory medicine

Refer people with persistent severe cough to a respiratory physician for further assessment and management.<sup>52</sup>

### Referrals to community physiotherapy or pulmonary rehabilitation

If a person is having ongoing issues with sputum production, refer to a physiotherapist with expertise in airway clearance. Their advice and technique may be beneficial. Further investigations for bronchiectasis may be indicated.

### Depression and anxiety

For the purposes of this guide, depression and anxiety have been grouped into a single category, noting they are two distinct symptoms which sometimes (but not always) present together.

It is reported that the frequency of depressive symptoms more than 12 weeks following COVID-19 infection ranges from 11 to 28%.<sup>53</sup>

The main risk factors associated with depression post COVID-19 are sex (women report higher rates of depression compared to men), previous psychiatric history, psychopathology at one month follow up, and systematic inflammation during the acute phase.<sup>53</sup> One study has hypothesised the severity of depressive symptoms to be proportional to the systematic inflammation measured at baseline during acute infection.<sup>54</sup> Research has also shown those patients reporting depressive symptoms may also have symptoms of cognitive dysfunction post COVID-19.<sup>55</sup>

Another key risk factor for the development of anxiety and/or depression post COVID-19 is uncertainty about what to expect when recovering from acute COVID-19. This highlights the need for patient reassurance, validation of symptoms, education and recommending follow-up with their general practitioner (GP) or primary care provider.<sup>10</sup>

It is yet to be determined whether the high frequency of depression and anxiety post COVID-19 is a long-term consequence of the viral infection, a consequence of the severity of other PASC (such as ongoing fatigue, social isolation, reduced exercise intolerance and impact on quality-of-life) or a result of the social and/or economic outcomes of the pandemic.<sup>53</sup>

## Assessment

The following validated scales may be used for assessment of symptoms of depression and anxiety. It is important to note that these are screening tools and should not be used on their own to make a diagnosis of clinical depression or assess severity.

- [Patient Health Questionnaire 9 \(PHQ-9\)](#)<sup>56</sup>
- [Quality of Life in Neurological Disorders \(Neuro-QoL\)](#)<sup>57</sup>
- [Depression, Anxiety and Stress Scale 21 \(DASS-21\)](#)<sup>58</sup>
- [Hospital Anxiety and Depression Scale \(HADS\)](#)<sup>59</sup>
- [Somatic and Psychological Health Report \(SPHERE\)](#) – this tool is particularly helpful for those suffering from persistent fatigue in addition to mental distress<sup>60</sup>

## Management

Treatment should be based on the severity of presenting symptoms. The NICE guidelines recommend prompt referral to avoid delaying support for people.<sup>10</sup> Evidence from lived experience has demonstrated that the earlier people receive help for anxiety and/or depression, the more effective the intervention.<sup>10</sup>

Management of symptoms may include referral to specialist services as listed below, and pharmacological interventions, such as antidepressants or benzodiazepines, prescribed in accordance with HealthPathways, the [Therapeutic Guidelines](#) and the [Australian Medicines Handbook](#).<sup>61, 62</sup> A clinical practice guideline for mood disorders is also available from the Royal Australian and New Zealand College of Psychiatrists.<sup>63</sup>

### Referral to psychology

For those with commonly reported mental health symptoms, such as symptoms of mild anxiety or depression, supportive counselling and close follow-up by the person's GP is indicated. Referral to a psychologist by the person's GP may also be required. Referral under a mental health care plan will provide a person with 20 subsidised sessions per annum (until December 2022). Alternatively, online programs are available. One is [This Way Up](#), developed by St Vincent's Hospital.<sup>64</sup> It provides a wide range of psychological strategies to manage issues such as returning to the workplace, mindfulness and resilience

tools. Other Australian online platforms include the [Black Dog Institute](#), [MindSpot](#), [MentalHealthOnline](#) and [moodgym](#).<sup>65-68</sup>

### Referral to psychiatric services

For those with more complex needs, referral to a consultation liaison psychiatry service or private psychiatrist may be indicated. Urgent referral to psychiatric services is available via the local health district community mental health service or via presentation to the emergency department.

## Post-traumatic stress disorder

Reported rates of PTSD post COVID-19 illness vary but may be as high as 30% of those hospitalised.<sup>69</sup> The diagnosis of PTSD, as defined in the *Diagnostic and statistical manual for mental disorders, 5th edition* (DSM-V) requires exposure to a traumatic event, which is defined as "actual or threatened death, serious injury or sexual violence".<sup>70</sup>

Some people may develop exacerbation or perpetuation of pre-existing PTSD from unrelated trauma, whereas others may have new onset PTSD following COVID-19 illness.<sup>71</sup> Similar incidences of PTSD have been noted in other epidemics such as SARS, MERS and Ebola.<sup>72</sup>

Associated characteristics for the development of PTSD following COVID-19 illness include female sex, history of psychiatric disorders, and delirium, or agitation during acute illness.<sup>69</sup> PTSD is known to be a common feature of post-intensive care syndrome, exacerbated by the use of sedation and analgesia in the ICU.<sup>73</sup> A greater number of persistent ongoing symptoms is also positively correlated with post-COVID-19 illness related PTSD.

## Assessment

There are two distinct diagnostic systems with differing criteria for PTSD:

- The DSM-V – includes 20 different symptoms across the domains of re-experiencing, avoidance, negative cognitions and moods and hyperarousal<sup>70</sup>
- The International Classification of Diseases, 11th revision (ICD-11) – includes six symptoms across three domains: re-experiencing, avoidance and hyperarousal<sup>74</sup>

## Management and referral to psychology or psychiatric services

Some people experiencing PTSD may be adequately managed by their GP using some of the treatment modalities listed below. Other people may benefit from referral to a clinical psychologist for specific trauma-related therapy such as trauma-focused cognitive behaviour therapy, eye movement desensitisation and reprocessing, imagery rehearsal therapy or equine therapy. Referral to a psychiatrist may be indicated in cases of severe, persisting symptoms impacting on functioning or where more complex pharmacotherapy advice is required.

A comprehensive account of evidence-based treatment of new and established cases of PTSD can be found in the NHMRC [Australian guidelines for the prevention and treatment of acute stress disorder, posttraumatic stress disorder and complex PTSD](#).<sup>75</sup> A medication prescribing algorithm is included in these guidelines.

## Cognitive impairment (“brain fog”)

▶ **Refer patients with new delirium, or focal neurological signs or symptoms to the emergency department or community acute mental health team for urgent review.**

A recent systemic review and meta-analysis found up to 22% of people experience ongoing cognitive symptoms such as ‘brain fog’, confusion and loss of memory post COVID-19 illness.<sup>76</sup> Risk factors associated with cognitive impairment include female sex, pre-existing cognitive impairment, frailty, increased age, hospitalisation, (particularly those treated in ICU with sedatives or analgesia), acute respiratory distress syndrome during hospitalisation and delirium during acute illness. Ongoing cognitive impairment may affect occupational, psychological and functional outcomes. Delirium in the context of acute COVID-19 illness may reveal underlying dementia.

## Assessment

There are a number of validated screening tools to assess for cognitive impairment, including:

- Mini-Mental State Examination (MMSE)<sup>77</sup>
- Montreal Cognitive Assessment (MoCA)<sup>78</sup>

- Rowland Universal Dementia Assessment Scale (RUDAS) – for people from culturally and linguistically diverse backgrounds<sup>79</sup>
- Kimberley Indigenous Cognitive Assessment (KICA) – for Aboriginal and Torres Strait Islander people, particularly those living in rural and remote areas of Australia<sup>80</sup>
- General Practitioner Assessment of Cognition (GPCOG)<sup>81</sup>

One of the limitations of these tools is that they are designed for use with older people, particularly those with symptoms of dementia, and may have limited sensitivity for cognitive decline in younger populations.<sup>76</sup> Tools that may be more suitable for younger people with cognitive symptoms include:

- Number span forward (attention) and backward (working memory)
- Trail Making Test Part A and B (processing speed and executive functioning)
- Hopkins Verbal Learning Test Revised<sup>17</sup>

When using these tools, it may be useful to also consider a standard measure of intelligence quotient and a person’s level of education to help inform interpretation of the results.

It is helpful to also have the person subjectively describe their symptoms. The following terms may also be used to describe persistent cognitive impairment post COVID-19 illness: brain fog, mental slowness, difficulty in maintaining attention and focus, executive processing problems, memory problems and learning, articulation, or psychomotor coordination difficulties.

It is important to note that cognitive impairment may be secondary to other PASC such as depression and hence, a holistic health assessment is required.<sup>82</sup> Assessment of cognitive impairment should be followed up by assessment of functional outcomes and quality of life to ascertain the impact on a person’s activities of daily living. Suitable tools include:

- [EuroQol-5 Dimension \(EQ-5D-5L\)](#)<sup>83</sup>
- [Barthel Index](#)<sup>84</sup>
- [12 item Short Form Survey \(SF-12\)](#)<sup>85</sup>
- [PROMIS-29](#)<sup>21</sup>

## Management

The treatment of cognitive impairment will depend on the types of symptoms described by the person. Referral to a rehabilitation physician, geriatrician and/or neuropsychologist may be indicated.

The following interventions have been shown to demonstrate improvement in symptoms of cognitive impairment:

- Aerobic exercise
- A full medication review by a general practitioner or rehabilitation physician, as some medications may exacerbate symptoms. For a person aged over 65, a geriatrician should be consulted.
- Improved sleep hygiene
- Improved nutrition
- Neuropsychological rehabilitation strategies, usually performed by a neuropsychologist or multidisciplinary rehabilitation service. The strategies may include neuroplasticity-based therapies such as cognitive mapping, errorless learning and repetition of information<sup>86-88</sup>

## Joint and muscle pain

Joint and/or muscle pain and stiffness is commonly reported post COVID-19 illness for a number of reasons including, but not limited to:

- Immobility, particularly for those hospitalised and treated in ICU (including the use of neuromuscular blockage and/or sedation)
- Proning, a common intervention for hospitalised patients, can also increase the risk of ongoing joint and muscle pain, peripheral neuropathy and compressive neuropathy
- Worsening of osteoarthritis or rheumatoid arthritis due to inflammatory molecules damaging cartilage during acute COVID-19 illness
- Use of steroid medications as a treatment for acute COVID-19
- New onset autoimmune polyarthropathy
- Reduced levels of activity or exercise secondary to ongoing fatigue
- Critical care neuropathy and peripheral neuropathy<sup>89</sup>

## Assessment

A full patient history should be undertaken, each involved joint inspected and palpated, and range of motion estimated. The presence of tenderness, warmth or swelling should be investigated. Movements, time of day or activities that exacerbate symptoms should be noted.

A medication history should be obtained. The clinician should explore if the person gains relief from over-the-counter medication such as anti-inflammatory agents, topical treatments, heat or ice.

Blood tests and imaging may be required based on history and examination findings. For those with a history of rheumatoid arthritis or new onset polyarthropathy, testing of antibodies and rheumatoid factors may be warranted, with referral to a rheumatologist where indicated.

## Management

In most instances, joint and/or muscle pain post COVID-19 illness will resolve within 2-3 months. Conservative management is usually adequate. Analgesia such as paracetamol or anti-inflammatories, such as ibuprofen, may be recommended. The use of heat packs may also provide relief. A physiotherapy assessment should be sought for individualised exercise prescription, particularly in the event of restricted range of motion or weakness.

If pain continues, referral to a rehabilitation medicine specialist, rheumatologist or pain specialist may be indicated.

## Functional mobility impairment

Reduced mobility and functional outcomes are a commonly reported symptom of PASC, particularly in people aged 65 years and over or those living with frailty. Examples include the reduced ability to engage in household activity, physical activity and stand up after sitting in a chair.<sup>90</sup> Emerging evidence suggests that even people diagnosed with mild to moderate COVID-19 can have ongoing functional challenges.<sup>90</sup> In older adults, without medical treatment, reduced mobility can result in fatigue, deconditioning and muscle atrophy which may lead to frailty.

## Assessment

Consistent with the International Classification of Functioning, Disability and Health definition, people should be asked to report changes in their mobility in three domains:

- Ability to move around their home, for example standing up after sitting in a chair
- Ability to engage in housework
- Ability to engage in physical activity, for example walking up a flight of stairs without assistance.<sup>91</sup>

For people aged 65 years or older, the [Physical Activity Scale for the Elderly](#) may be used to assess information on leisure, household and occupational activity.<sup>92</sup>

### Referral to physiotherapy and/or occupational therapy for further assessment

Referral to a physiotherapist may be indicated for further assessments including:

- six-minute walk test
- five repetition sit to stand or one minute sit to stand<sup>93</sup>
- Berg balance scale
- Timed up and go test
- Barthel index
- Functional independence measure

Assessment by an occupational therapist will include assessment of both physical function and home environment. This is particularly important if concerns for safety of the person in their own home are present.

## Management

### Referral to multidisciplinary rehabilitation

For those people with significant mobility impairment, particularly that associated with deconditioning, referral to a rehabilitation physician for a comprehensive multidisciplinary rehabilitation assessment and intervention is recommended. Multidisciplinary rehabilitation may be delivered in an inpatient, day program or outpatient modality depending on symptom burden. This rehabilitation program may involve interventions including falls prevention, muscle strengthening, balance training, training for activities of daily living (for example cooking), home assessment and cognitive mapping.

### Referral to outpatient or community allied health services

In mild to moderate cases of reduced mobility, referral to an outpatient or community physiotherapist and/or occupational therapist is appropriate. Exercise prescription and education can be provided to improve functional abilities, pacing and energy conservation. Adding in a social element via a group program, such as a falls prevention or exercise group, may improve adherence and motivation. Technology may be used to support self-directed exercise programs. Assessment of the safety of the home environment by an occupational therapist may include recommendations for home modifications or assistive technology where required.

### Palpitations and chest pain

▶ **Syncope, unexplained chest pain, palpitations, or arrhythmias – refer patient to the emergency department for urgent assessment**

Cardiovascular symptoms, including chest pain and palpitations, are common post acute COVID-19, but are usually not associated with serious pathology. The clinical priority is to differentiate musculoskeletal and other non-specific chest pain from serious conditions.<sup>94</sup>

Recent research by Xie et al. assessed the incidence of a number of long-term cardiovascular complications in a cohort of 153,760 people who had been diagnosed with COVID-19.<sup>45</sup>

This research indicated an increased risk of myocarditis and pericarditis. The same research also identified that in the 12 months following acute COVID-19 illness, a large veterans cohort in the United States demonstrated an increased risk of ischemic heart disease, including acute coronary disease, myocardial infarction, ischaemic cardiomyopathy and angina. An increased incidence of arrhythmias including atrial fibrillation is also reported post COVID-19 diagnosis.

Palpitations and symptoms such as dizziness and elevated heart rate are common, being reported in 20% of people diagnosed with COVID-19.<sup>95</sup> It is common for palpitations to occur as a result of deconditioning after prolonged inactivity during the acute COVID-19 illness. Psychological distress may also lead to heart palpitations in people who have recovered from COVID-19.<sup>96</sup>

POTS post COVID-19 illness has been reported in case reports and series.<sup>97</sup> However, the exact incidence is difficult to determine as there has not been a systematic evaluation of POTS in COVID-19 survivors.

## Assessment

While most instances of palpitations and/or chest pain post COVID-19 are not serious, due to the potential consequences, full emergency assessment is required if a person has acute cardiac chest pain.

Ischaemic heart disease, ischaemic cardiomyopathy and arrhythmia may all contribute to or cause exertional dyspnoea. Consider these diagnoses, especially in those with a history of heart disease or risk factors for ischaemic heart disease, and investigate as appropriate. Refer to the [Heart Foundation guidelines](#) as required.<sup>98</sup>

Evaluation of new onset chest pain should be performed in an emergency department using the NSW Health Guideline [Pathway for Acute Coronary Syndrome](#).<sup>99</sup> This pathway recommends the use of serial ECG and troponin testing to risk stratify patients into groups requiring invasive angiography or suitable for non-invasive testing with exercise stress testing, CT coronary angiography or stress echocardiography depending on local availability and patient factors.

Further evaluation of chest pain should include echocardiography to investigate left ventricular function, exclude regional wall motion abnormalities and exclude the presence of pericardial effusions.<sup>97</sup>

Further evaluation of palpitations can include echocardiography, ambulatory ECG monitoring and dynamic evaluation of heart rate and blood pressure (for example lying and standing or tilt testing). A definite diagnosis of POTS syndrome should be made at a centre familiar with this condition.

## Management

Management of chest pain post COVID-19 is dependent on the aetiology identified using the [Pathway for Acute Coronary Syndrome](#) evaluation following the Heart Foundation [Acute Coronary Syndrome \(ACS\) clinical guidelines](#).<sup>98, 99</sup>

In the majority of cases, no concerning aetiology is identified, and the management is supportive. If post-COVID-19 pericarditis and myocarditis is identified, then serial clinical and echocardiographic review is warranted. The use of specific therapeutic agents, including angiotensin-converting enzyme (ACE) inhibitors, remains investigational with no supporting evidence from clinical trials currently.<sup>100</sup>

Management of post-COVID-19 POTS is complex. Referral to a specialist with experience in managing POTS is recommended.

## Altered sense of taste and/or smell (persistent gustatory and/or olfactory dysfunction)

Persistent alterations in sense of taste and/or smell are one of the most commonly reported PASC with the potential to affect mood, food enjoyment, nutritional intake, reduced ability to detect dangers (for example fire), mental health status and social life.<sup>101</sup> Research published by Vaira et al. found that 22.3% of respondents reported ongoing gustatory symptoms six months or more post-diagnosis of COVID-19.<sup>102</sup> 29.5% of people reported ongoing olfactory symptoms. People with persistent gustatory or olfactory dysfunction also report ongoing issues with appetite loss, weight loss, loss of pleasure in food, eating and social engagement, altered intimacy and an altered relationship to self and others.<sup>101</sup>

Studies have suggested several probable mechanisms for the development of olfactory dysfunction post COVID-19 illness, including olfactory cleft syndrome with mucosal obstruction, post-viral anosmia syndrome, cytokine storm, direct damage of olfactory sensory neurons and impairment of the olfactory perception centre in the brain.<sup>103</sup> Post-viral olfactory dysfunction is known to occur with other viral illnesses such as influenza.

## Assessment

The clinician should perform a full comprehensive examination to rule out any other causes for the person's symptoms, such as nasal polyps, dental problems or cigarette smoking. Certain medications can also cause altered sense of taste or smell. Referral to an ear, nose and throat specialist for in-depth assessment may be indicated.

There is no specific diagnostic test to assess altered senses of smell or taste. The experience is subjective and hence, the clinician must rely on the person's self-reported experience. There are several ways to measure symptoms more objectively such as:

- Olfactory psychophysical assessment tools, such as odour thresholds (measuring the lowest strength of a chemical that you can recognise), odour discrimination (differentiation between different odours) and odour identification (identification of odours)<sup>104</sup>
- Comparing tastes and smells of different chemicals
- Scratch and sniff tests
- Sip, spit and rinse tests where chemicals are placed on certain parts of the tongue.<sup>105</sup>

## Management

Evidence on the best management strategies for ongoing gustatory or olfactory symptoms post COVID-19 is still emerging, however olfactory training is considered a promising treatment option.

Olfactory training involves the person exposing themselves to four different odours twice daily for at least 24 weeks. The different scents are typically phenylethyl alcohol (rose scent), eucalyptol (eucalyptus scent), citronella (lemon scent), and eugenol (clove scent).<sup>106</sup> Further instructions on how to educate people on setting up and performing olfactory training are outlined in [Olfactory Training: Continuing Education Activity](#).<sup>106</sup>

## Glossary

CTPA	Computed tomography pulmonary angiogram
CXR	Chest x-ray
DLCO	Diffusing capacity for carbon monoxide
DSM-V	<i>Diagnostic and statistical manual for mental disorders (5th edition)</i>
DVT	Deep vein thrombosis
GP	General practitioner
ME/CFS	Myalgic encephalomyelitis or chronic fatigue syndrome
PASC	Post-acute sequelae of COVID-19
PE	Pulmonary embolism
POTS	Postural orthostatic tachycardia syndrome

## Acknowledgements

Thank you to the following clinicians and subject matter experts who provided their input and expertise into development of this clinical practice guide.

Professor Peter Wark	Senior Staff Specialist, Rehabilitation and Sleep Medicine, John Hunter Hospital, Hunter New England Local Health District; Conjoint Professor, University of Newcastle
Professor Steven Faux	Director, St Vincent's Hospital Department of Rehabilitation Medicine and Pain Medicine; Conjoint Professor, St Vincent's Clinical School, University of New South Wales; Adjunct Professor, School of Medicine, University of Notre Dame, Sydney
Professor Jennifer Alison	Professor of Allied Health, Sydney Local Health District; Professor of Respiratory Physiotherapy, University of Sydney
A/Professor Lissa Spencer	Clinical Specialist Physiotherapist (Pulmonary, Cardiac and Chronic Disease Rehabilitation), Royal Prince Alfred Hospital, Sydney Local Health District; Clinical Associate Professor, University of Sydney
Dr Aravinda Thiagalingam	Senior Staff Specialist, Cardiology, Western Sydney Local Health District; Senior Lecturer, Westmead Clinical School, University of Sydney
Dr David Joffe	Visiting Medical Officer, Respiratory and Sleep Medicine, Royal North Shore Hospital, Northern Sydney Local Health District; Convenor Respiratory Failure Service, Woolcock Institute of Medical Research (Sleep Group)
Dr Kate George	General Practitioner; Lead Clinical Editor, HealthPathways Sydney
Dr Martina Gleeson	General Practitioner; Clinical Lead General Practice, South Eastern Sydney Health Pathways, Regional Clinical Advisor, HealthPathways NSW
Professor Kathleen (Kay) Wilhelm	Research Director, Faces in the Street, St Vincent's Urban Mental Health Research Institute; Consultant Psychiatrist, St Vincent's and Mater Health Service; Conjoint Professor, University of NSW
Andrew Davison	Chief Allied Health Officer, NSW Ministry of Health
Louise Sellars	Rehabilitation Network Manager, Agency for Clinical Innovation; Secretariat NSW COVID-19 Rehabilitation Community of Practice
Helen Kulas	Respiratory Network Manager, Agency for Clinical Innovation; Secretariat NSW COVID-19 Respiratory Community of Practice

## Appendix A: Recommended services and clinicians for the establishment of a dedicated PASC clinic

Dedicated PASC clinics have been established in a number of other jurisdictions including the United Kingdom (where over 70 long-COVID clinics exist), the Royal Melbourne Hospital and in Canada. A number of other models are included in the Critical Intelligence Unit's [Post acute and subacute COVID-19 care evidence check](#).<sup>13</sup> Based on existing models, the following services and clinicians should be included, noting that not all patients will require access to every discipline:

- Respiratory physician
- Rehabilitation physician
- Pulmonary rehabilitation service
- Geriatric medicine
- An allied health practitioner or nurse to act in a coordinator and patient education function
- Allied health practitioners including physiotherapy, occupational therapy, speech pathology, clinical psychology, neuropsychology, dietetics, exercise physiology and social work
- Access to interpreter services
- Access to Aboriginal health services
- Other medical specialties, which may be required depending on patient symptoms, include but are not limited to, cardiology, infectious diseases, rheumatology, haematology, psychiatry, drug and alcohol services, endocrinology and renal medicine.

Access and use of data including patient-reported measures (with the COVID-19 Yorkshire Rehabilitation Screen) and the Australasian Rehabilitation Outcomes Centre adjunct COVID-19 data set is also recommended to guide patient management, monitor progress and assist with service planning.

## References

- World Health Organization. A clinical case definition of post COVID-19 condition by a Delphi consensus, 6 October 2021 [internet]. WHO: Switzerland; 2021 Oct 6 [cited 2022 Jan 24]. Available from: [https://www.who.int/publications/i/item/WHO-2019-nCoV-Post\\_COVID-19\\_condition-Clinical\\_case\\_definition-2021.1](https://www.who.int/publications/i/item/WHO-2019-nCoV-Post_COVID-19_condition-Clinical_case_definition-2021.1)
- Royal Australian College of General Practitioners. Caring for patients with post-COVID-19 conditions [internet]. Melbourne: RACGP; updated December 2021 [cited 14 April 2022]. Available from: <https://www.racgp.org.au/clinical-resources/covid-19-resources/clinical-care/caring-for-patients-with-post-covid-19-conditions>
- World Health Organization. Coronavirus disease (COVID-19): Post COVID-19 condition [internet]. WHO: Switzerland; 2021 Dec 16 [cited 2022 May 23]. Available from: [https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-\(covid-19\)-post-covid-19-condition](https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-(covid-19)-post-covid-19-condition)
- O'Brien H, Tracey MJ, Ottewill C, et al. An integrated multidisciplinary model of COVID-19 recovery care. *J Med Sci*. 2021 May;190(2):461-8. DOI: 10.1007/s11845-020-02354-9
- Cai X, Hu X, Ekumi IO, et al. Psychological Distress and Its Correlates Among COVID-19 Survivors During Early Convalescence Across Age Groups. *Am J Geriatr Psychiatry*. 2020 Oct;28(10):1030-9. DOI: 10.1016/j.jagp.2020.07.003
- Almeria M, Cejudo JC, Sotoca J, et al. Cognitive profile following COVID-19 infection: Clinical predictors leading to neuropsychological impairment. *Brain Behav Immun Health*. 2020 Dec;9:100163. DOI: 10.1016/j.bbih.2020.100163
- NSW Agency for Clinical Innovation. Management of adults with COVID-19 in the post-acute phase: A model of care for NSW health clinicians [internet]. Sydney: ACI; October 2021 [cited 14 April 2022]. Available from: [https://aci.health.nsw.gov.au/\\_data/assets/pdf\\_file/0008/687446/ACI-COP-Management-of-adults-with-COVID-in-the-post-acute-phase.pdf](https://aci.health.nsw.gov.au/_data/assets/pdf_file/0008/687446/ACI-COP-Management-of-adults-with-COVID-in-the-post-acute-phase.pdf)
- Antonelli M, Penfold RS, Merino J, et al. Risk factors and disease profile of post-vaccination SARS-CoV-2 infection in UK users of the COVID Symptom Study app: a prospective, community-based, nested, case-control study. *Lancet Infect Dis*. 2021 Sep 1. DOI: 10.1016/s1473-3099(21)00460-6
- Simon MA, Luginbuhl RD, Parker R. Reduced Incidence of Long-COVID Symptoms Related to Administration of COVID-19 Vaccines Both Before COVID-19 Diagnosis and Up to 12 Weeks After. *medRxiv*. 2021:2021.11.17.21263608. DOI: 10.1101/2021.11.17.21263608
- National Institute for Health and Care Excellence. COVID-19 rapid guideline: managing the long-term effects of COVID-19 [internet]. NICE: UK; Dec 2020, updated 11 Nov 2021 [cited 24 Jan 2022]. Available from: <https://www.nice.org.uk/guidance/ng188>
- COVID-19 Critical Intelligence Unit. Living Evidence - post acute sequelae of COVID-19 [internet]. Sydney: ACI; updated 13 Apr 2022 [cited 14 April 2022]. Available from: <https://aci.health.nsw.gov.au/covid-19/critical-intelligence-unit/post-acute-sequelae>
- COVID-19 Critical Intelligence Unit. In brief: Post acute sequelae of COVID-19 (long COVID) [internet]. Sydney: ACI; 1 Apr 2022 [cited 14 April 2022]. Available from: [https://aci.health.nsw.gov.au/\\_data/assets/pdf\\_file/0004/695983/Evidence-Check-Post-acute-sequelae-of-COVID-19.pdf](https://aci.health.nsw.gov.au/_data/assets/pdf_file/0004/695983/Evidence-Check-Post-acute-sequelae-of-COVID-19.pdf)
- COVID-19 Critical Intelligence Unit. Evidence check: Post-acute and subacute COVID-19 care [internet]. Sydney: ACI; 11 Feb 2022 [cited 14 April 2022]. Available from: [https://aci.health.nsw.gov.au/\\_data/assets/pdf\\_file/0008/685097/Evidence-Check-Post-acute-and-subacute-COVID-19-care.pdf](https://aci.health.nsw.gov.au/_data/assets/pdf_file/0008/685097/Evidence-Check-Post-acute-and-subacute-COVID-19-care.pdf)
- COVID-19 Critical Intelligence Unit. Breathlessness post COVID-19 [internet]. Sydney: ACI; 4 May 2022 [cited 5 May 2022]. Available from: [https://aci.health.nsw.gov.au/\\_data/assets/pdf\\_file/0004/723613/Evidence-Check-Breathlessness-post-COVID-19.pdf](https://aci.health.nsw.gov.au/_data/assets/pdf_file/0004/723613/Evidence-Check-Breathlessness-post-COVID-19.pdf)
- NSW Agency for Clinical Innovation. Frailty screening and assessment tools [internet]. Sydney: ACI; September 2020 [cited 14 Apr 2022]. Available from: <https://aci.health.nsw.gov.au/networks/frailty-taskforce/resources/frailty-screening-and-assessment-tools>
- Cervia C, Zurbuchen Y, Taeschler P, et al. Immunoglobulin signature predicts risk of post-acute COVID-19 syndrome. *Nat Commun*. 2022 Jan 25;13(1):446. DOI: 10.1038/s41467-021-27797-1
- Becker C, Beck K, Zumbunn S, et al. Long COVID 1 year after hospitalisation for COVID-19: a prospective bicentric cohort study. *Swiss Med Wkly*. 2021 Oct 11;151:w30091. DOI: 10.4414/smw.2021.w30091
- Fernández-de-Las-Peñas C, Pellicer-Valero OJ, Navarro-Pardo E, et al. Symptoms Experienced at the Acute Phase of SARS-CoV-2 Infection as Risk Factor of Long-term Post-COVID Symptoms: The LONG-COVID-EXP-CM Multicenter Study. *Int J Infect Dis*. 2022 Mar;116:241-4. DOI: 10.1016/j.ijid.2022.01.007
- Baratta JM, Tompany A, Siano S, et al. Postacute Sequelae of COVID-19 Infection and Development of a Physiatry-Led Recovery Clinic. *Am J Phys Med Rehabil*. 2021;100(7):633-4. DOI: 10.1097/PHM.0000000000001778

20. O'Connor RJ, Preston N, Parkin A, et al. The COVID-19 Yorkshire Rehabilitation Scale (C19-YRS): Application and psychometric analysis in a post-COVID-19 syndrome cohort. *Journal of Medical Virology*. 2022;94(3):1027-34. DOI: <https://doi.org/10.1002/jmv.27415>
21. PROMIS Health Organization. PROMIS–29 Profile v2.1 [internet]. Sydney: NSW Agency for Clinical Innovation; Apr 2022 [cited 14 Apr 2022]. Available from: [https://aci.health.nsw.gov.au/\\_data/assets/pdf\\_file/0006/632859/Patient-Reported-Outcome-Measures-Information-System-PROMIS-29-Profile.pdf](https://aci.health.nsw.gov.au/_data/assets/pdf_file/0006/632859/Patient-Reported-Outcome-Measures-Information-System-PROMIS-29-Profile.pdf)
22. EuroQol Group. Health Questionnaire (EQ-5D-5L) [internet]. Sydney: NSW Agency for Clinical Innovation; 2022 [cited 14 Apr 2022]. Available from: [https://aci.health.nsw.gov.au/\\_data/assets/pdf\\_file/0003/632847/EuroQol-5-Dimension.pdf](https://aci.health.nsw.gov.au/_data/assets/pdf_file/0003/632847/EuroQol-5-Dimension.pdf)
23. Davis HE, Assaf GS, McCorkell L, et al. Characterizing long COVID in an international cohort: 7 months of symptoms and their impact. *E Clinical Medicine*. 2021 01 Aug;38:101019. DOI: 10.1016/j.eclinm.2021.101019
24. Gaber T. Assessment and management of post-COVID fatigue. *Prog Neurol Psychiatry*. 2021;25(1):36-9. DOI: 10.1002/pnp.698
25. Townsend L, Dyer AH, Jones K, et al. Persistent fatigue following SARS-CoV-2 infection is common and independent of severity of initial infection. *PLoS One*. 2020;15(11):e0240784. DOI: 10.1371/journal.pone.0240784
26. National Institute for Health and Care Excellence. Myalgic encephalomyelitis (or encephalopathy)/chronic fatigue syndrome: diagnosis and management. NICE guideline [NG206] [internet]. United Kingdom: NICE; 29 Oct 2022 [cited 14 Apr 2022]. Available from: <https://www.nice.org.uk/guidance/ng206>
27. Sisó-Almirall A, Brito-Zerón P, Conangla Ferrín L, et al. Long Covid-19: Proposed Primary Care Clinical Guidelines for Diagnosis and Disease Management. *Int J Environ Res Public Health*. 2021 Apr 20;18(8). DOI: 10.3390/ijerph18084350
28. MDApp. Fatigue Severity Scale (FSS) [internet]. Manchester, England: MDApp; Apr 2020 [cited 14 Apr 2022]. Available from: <https://www.mdapp.co/fatigue-severity-scale-fss-calculator-372/>
29. The University of Texas M. D. Anderson Cancer Center. Brief Fatigue Inventory [internet]. New York, USA: National Palliative Care Research Center; 1997 [cited 14 April 2022]. Available from: [http://www.npcrc.org/files/news/brief\\_fatigue\\_inventory.pdf](http://www.npcrc.org/files/news/brief_fatigue_inventory.pdf)
30. Chung F, Abdullah HR, Liao P. STOP-Bang Questionnaire: A Practical Approach to Screen for Obstructive Sleep Apnea. *Chest*. 2016 Mar;149(3):631-8. DOI: 10.1378/chest.15-0903
31. Your COVID recovery. Long COVID [internet]. England: NHS England; Dec 2020 [cited 14 Apr 2022]. Available from: <https://www.yourcovidrecovery.nhs.uk/what-is-covid-19/long-covid>
32. Kuut TA, Müller F, Aldenkamp A, et al. A randomised controlled trial testing the efficacy of Fit after COVID, a cognitive behavioural therapy targeting severe post-infectious fatigue following COVID-19 (ReCOVer): study protocol. *Trials*. 2021 Dec 2;22(1):867. DOI: 10.1186/s13063-021-05569-y
33. University of New South Wales. UNSW Fatigue Clinic [internet]. Sydney: UNSW; [cited 14 Apr 2022]. Available from: <https://www.fatigueclinic.unsw.edu.au>
34. Huang C, Huang L, Wang Y, et al. 6-month consequences of COVID-19 in patients discharged from hospital: a cohort study. *The Lancet*. 2021;397(10270):220-32. DOI: 10.1016/S0140-6736(20)32656-8
35. Bellan M, Soddu D, Balbo PE, et al. Respiratory and Psychophysical Sequelae Among Patients With COVID-19 Four Months After Hospital Discharge. *JAMA Netw Open*. 2021 Jan 4;4(1):e2036142. DOI: 10.1001/jamanetworkopen.2020.36142
36. Shah AS, Wong AW, Hague CJ, et al. A prospective study of 12-week respiratory outcomes in COVID-19-related hospitalisations. *Thorax*. 2021 Apr;76(4):402-4. DOI: 10.1136/thoraxjnl-2020-216308
37. Morin L, Savale L, Pham T, et al. Four-Month Clinical Status of a Cohort of Patients After Hospitalization for COVID-19. *JAMA*. 2021 Apr 20;325(15):1525-34. DOI: 10.1001/jama.2021.3331
38. Groff D, Sun A, Ssentongo AE, et al. Short-term and Long-term Rates of Postacute Sequelae of SARS-CoV-2 Infection: A Systematic Review. *JAMA Netw Open*. 2021;4(10):e2128568-e. DOI: 10.1001/jamanetworkopen.2021.28568
39. George PM, Barratt SL, Condliffe R, et al. Respiratory follow-up of patients with COVID-19 pneumonia. *Thorax*. 2020 Nov;75(11):1009-16. DOI: 10.1136/thoraxjnl-2020-215314
40. Yorke J, Moosavi SH, Shuldham C, et al. Quantification of dyspnoea using descriptors: development and initial testing of the Dyspnoea-12. *Thorax*. 2010 Jan;65(1):21-6. DOI: 10.1136/thx.2009.118521
41. Gungor S, Tosun B, Unal N, et al. Evaluation of dyspnea severity and sleep quality in patients with novel coronavirus. *Int J Clin Pract*. 2021 Oct;75(10):e14631. DOI: 10.1111/ijcp.14631
42. Truffaut L, Demey L, Bruyneel AV, et al. Post-discharge critical COVID-19 lung function related to severity of radiologic lung involvement at admission. *Respir Res*. 2021 Jan 21;22(1):29. DOI: 10.1186/s12931-021-01625-y

43. Stewart I, Jacob J, George P, et al. Interstitial lung damage following COVID-19 hospitalisation: an interim analysis of the UKILD Post-COVID study. medRxiv. 2022.03.10.22272081. DOI: 10.1101/2022.03.10.22272081
44. Greenhalgh T, Javid B, Knight M, et al. What is the efficacy and safety of rapid exercise tests for exertional desaturation in covid-19? [internet]. Oxford, England: The Centre for Evidence-Based Medicine; April 2020 [cited 31 Aug 2020]. Available from: <https://www.cebm.net/covid-19/what-is-the-efficacy-and-safety-of-rapid-exercise-tests-for-exertional-desaturation-in-covid-19>
45. Xie Y, Xu E, Bowe B, et al. Long-term cardiovascular outcomes of COVID-19. Nat Med. 2022 Feb 7. DOI: 10.1038/s41591-022-01689-3
46. Han X, Fan Y, Alwalid O, et al. Six-month Follow-up Chest CT Findings after Severe COVID-19 Pneumonia. Radiology. 2021;299(1):E177-E86. DOI: 10.1148/radiol.2021203153
47. Solomon JJ, Heyman B, Ko JP, et al. CT of Post-Acute Lung Complications of COVID-19. Radiology. 2021;301(2):E383-E95. DOI: 10.1148/radiol.2021211396
48. Gloeckl R, Leitl D, Jarosch I, et al. Benefits of pulmonary rehabilitation in COVID-19: a prospective observational cohort study. ERJ Open Res. 2021;7(2):00108-2021. DOI: 10.1183/23120541.00108-2021
49. van Belle A, Büller HR, Huisman MV, et al. Effectiveness of managing suspected pulmonary embolism using an algorithm combining clinical probability, D-dimer testing, and computed tomography. JAMA. 2006 Jan 11;295(2):172-9. DOI: 10.1001/jama.295.2.172
50. Garrigues E, Janvier P, Kherabi Y, et al. Post-discharge persistent symptoms and health-related quality of life after hospitalization for COVID-19. J Infect. 2020 Dec;81(6):e4-e6. DOI: 10.1016/j.jinf.2020.08.029
51. Naeije R, Caravita S. Phenotyping long COVID. Eur Respir J. 2021;58(2):2101763. DOI: 10.1183/13993003.01763-2021
52. Gibson PG, Chang AB, Glasgow NJ, et al. CICADA: Cough in Children and Adults: Diagnosis and Assessment. Australian Cough Guidelines summary statement. Med J Aust. 2010;192(5):265-71. DOI: 10.5694/j.1326-5377.2010.tb03504.x
53. Renaud-Charest O, Lui LMW, Eskander S, et al. Onset and frequency of depression in post-COVID-19 syndrome: A systematic review. J Psychiatr Res. 2021;144:129-37. DOI: 10.1016/j.jpsychires.2021.09.054
54. Mazza MG, Palladini M, De Lorenzo R, et al. Persistent psychopathology and neurocognitive impairment in COVID-19 survivors: Effect of inflammatory biomarkers at three-month follow-up. Brain Behav Immun. 2021 May;94:138-47. DOI: 10.1016/j.bbi.2021.02.021
55. Mattioli F, Stampatori C, Righetti F, et al. Neurological and cognitive sequelae of Covid-19: a four month follow-up. J Neurol. 2021 Dec;268(12):4422-8. DOI: 10.1007/s00415-021-10579-6
56. MDCalc. PHQ-9 (Patient Health Questionnaire-9) [internet]. New York, USA: MDCalc; 2019 [cited 14 Apr 2022]. Available from: <https://www.mdcalc.com/phq-9-patient-health-questionnaire-9>
57. AbilityLab. Neuro QOL [internet]. Chicago, USA: AbilityLab; 01 Aug 2019 [cited 14 Apr 2022]. Available from: <https://www.sralab.org/rehabilitation-measures/neuro-qol>
58. Lovibond SH, Lovibond PF. DASS21 [internet]. Sydney: Agency for Clinical Innovation; 2021 [cited 14 Apr 2022]. Available from: [https://aci.health.nsw.gov.au/\\_data/assets/pdf\\_file/0008/632843/Depression-Anxiety-Stress-Scale-21.pdf](https://aci.health.nsw.gov.au/_data/assets/pdf_file/0008/632843/Depression-Anxiety-Stress-Scale-21.pdf)
59. Zigmond AS, Snaith RP. Hospital Anxiety and Depression Scale (HADS) [internet]. South Africa: Sexual Violence Research Initiative; 2019 [cited 14 Apr 2022] <https://www.svri.org/sites/default/files/attachments/2016-01-13/HADS.pdf>
60. Couvy-Duchesne B, Davenport TA, Martin NG, et al. Validation and psychometric properties of the Somatic and Psychological Health REport (SPHERE) in a young Australian-based population sample using non-parametric item response theory. BMC Psychiatry. 01 Aug 2017;17(1):279. DOI: 10.1186/s12888-017-1420-1
61. Therapeutic Guidelines [internet]. Melbourne: Therapeutic Guidelines; 2021 [cited 14 Apr 2022]. Available from: <https://www.tg.org.au>
62. Australian Medicines Handbook [internet]. Adelaide: Australian Medicines Handbook; Jan 2022 [cited 14 Apr 2022]. Available from: <https://amhonline.amh.net.au>
63. Malhi GS, Bell E, Bassett D, et al. The 2020 Royal Australian and New Zealand College of Psychiatrists clinical practice guidelines for mood disorders. Aust NZ J Psychiatry. 2021 Jan;55(1):7-117. DOI: 10.1177/0004867420979353
64. St Vincent's Hospital, University of New South Wales. This way up [internet]. Sydney: St. Vincent's Hospital; 2020, updated Mar 2022 [cited 14 Apr 2022]. Available from: <https://thiswayup.org.au>
65. Black Dog Institute. COVID-19: Resources for Anxiety & Stress [internet]. Sydney: Black Dog Institute; 2022 [cited 14 Apr 2022]. Available from: <https://www.blackdoginstitute.org.au/resources-support/coronavirus-resources-for-anxiety-stress>
66. Macquarie University Health Sciences Centre. MindSpot [internet]. Sydney: Macquarie University; 2021 [cited 14 Apr 2022]. Available from: <https://www.mindspot.org.au>

67. Swinburne University National eTherapy Centre. Mental Health Online [internet]. Ver 3.0.5.26282. Victoria: Swinburne University; 2022 [cited 14 Apr 2022]. Available from: <https://www.mentalhealthonline.org.au>
68. Australian National University. moodgym [internet]. Canberra: e-hub Health; n.d. [cited 14 Apr 2022]. Available from: <https://moodgym.com.au>
69. Janiri D, Carfi A, Kotzalidis GD, et al. Posttraumatic Stress Disorder in Patients After Severe COVID-19 Infection. *JAMA Psychiatry*. 2021 May 1;78(5):567-9. DOI: 10.1001/jamapsychiatry.2021.0109
70. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders : DSM-5 [Electronic book]. Washington, D.C: American Psychiatric Association; 2013. Available from: <https://dsm.psychiatryonline.org/doi/book/10.1176/appi.books.9780890425787>
71. Cooper J, Phelps AJ, Ng CH, et al. Diagnosis and treatment of post-traumatic stress disorder during the COVID-19 pandemic. *Aust J Gen Pract*. 2020 Dec;49(12):785-9. DOI: 10.31128/ajgp-07-20-5557
72. Lei L, Zhu H, Li Y, et al. Prevalence of post-traumatic stress disorders and associated factors one month after the outbreak of the COVID-19 among the public in southwestern China: a cross-sectional study. *BMC Psychiatry*. 2021 Nov 4;21(1):545. DOI: 10.1186/s12888-021-03527-1
73. Rawal G, Yadav S, Kumar R. Post-intensive Care Syndrome: an Overview. *J Transl Int Med*. 2017;5(2):90-2. DOI: 10.1515/jtim-2016-0016
74. World Health Organization. International Classification of Diseases, 11th revision (ICD-11) [internet]. Version 2. Switzerland: WHO; 2019, updated 2022 [cited 14 Apr 2022]. Available from: <https://icd.who.int>
75. National Health and Medical Research Council. Australian guidelines for the prevention and treatment of acute stress disorder, posttraumatic stress disorder and complex PTSD. Victoria: Phoenix Australia; 2021 [cited 14 Apr 2022]. Available from: <https://www.phoenixaustralia.org/australian-guidelines-for-ptsd>
76. Ceban F, Ling S, Lui LMW, et al. Fatigue and cognitive impairment in Post-COVID-19 Syndrome: A systematic review and meta-analysis. *Brain Behav Immun*. 2021;101:93-135. DOI: 10.1016/j.bbi.2021.12.020
77. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res*. 1975 Nov;12(3):189-98. DOI: 10.1016/0022-3956(75)90026-6
78. Nasreddine ZS, Phillips NA, Bédirian V, et al. The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment. *J Am Geriatr Soc*. 2005 Apr;53(4):695-9. DOI: 10.1111/j.1532-5415.2005.53221.x
79. Storey JE, Rowland JTJ, Conforti DA, et al. The Rowland Universal Dementia Assessment Scale (RUDAS): a multicultural cognitive assessment scale. *International Psychogeriatrics*. 2004;16(1):13-31. DOI: 10.1017/S1041610204000043
80. Marsh G, Inglis M, Smith K, et al. Validation of the Kimberley Indigenous Cognitive Assessment Tool (KICA) in rural and remote Indigenous communities of the Northern Territory [internet]. Northern Territory: Dementia Australia; 2020 [cited 14 Apr 2022]. Available from: [https://www.dementia.org.au/sites/default/files/Validation\\_of\\_the\\_Kimberley\\_Indigenous\\_Cognitive\\_Assessment\\_tool\\_%28KICA%29.pdf](https://www.dementia.org.au/sites/default/files/Validation_of_the_Kimberley_Indigenous_Cognitive_Assessment_tool_%28KICA%29.pdf)
81. Dementia Collaborative Research Centre. General Practitioner Assessment of Cognition [internet]. Sydney: University of New South Wales; 2016 [cited 14 Apr 2022]. Available from: <http://gpcog.com.au>
82. Taquet M, Geddes JR, Husain M, et al. 6-month neurological and psychiatric outcomes in 236379 survivors of COVID-19: a retrospective cohort study using electronic health records. *Lancet Psychiatry*. 2021;8(5):416-27. DOI: 10.1016/S2215-0366(21)00084-5
83. Janssen MF, Bonsel GJ, Luo N. Is EQ-5D-5L Better Than EQ-5D-3L? A Head-to-Head Comparison of Descriptive Systems and Value Sets from Seven Countries. *Pharmacoeconomics*. 2018 Jun;36(6):675-97. DOI: 10.1007/s40273-018-0623-8
84. Mahoney FI, Barthel DW. Functional Evaluation: The Barthel Index. *Md State Med J*. 1965 Feb;14:61-5.
85. Ware J, Jr., Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Med Care*. 1996 Mar;34(3):220-33. DOI: 10.1097/00005650-199603000-00003
86. Graham EL, Clark JR, Orban ZS, et al. Persistent neurologic symptoms and cognitive dysfunction in non-hospitalized Covid-19 "long haulers". *Ann Clin Transl Neurol*. 2021 May;8(5):1073-85. DOI: 10.1002/acn3.51350
87. Kalter L. Scientists See Hope in New Therapy for COVID Brain Fog Patients [internet]. WebMD; 10 Feb 2022 [cited 14 Apr 2022]. Available from: <https://www.webmd.com/lung/news/20220210/hope-for-covid-brain-fog>
88. Sozzi M, Algeri L, Corsano M, et al. Neuropsychology in the Times of COVID-19. The Role of the Psychologist in Taking Charge of Patients With Alterations of Cognitive Functions. *Front Neurol*. 2020 2020-October-15;11. DOI: 10.3389/fneur.2020.573207

89. Fernández-de-las-Peñas C, Navarro-Santana M, Plaza-Manzano G, et al. Time course prevalence of post-COVID pain symptoms of musculoskeletal origin in patients who had survived to severe acute respiratory syndrome coronavirus 2 infection: a systematic review and meta-analysis. *PAIN*. 9000. DOI: 10.1097/j.pain.0000000000002496
90. Beauchamp MK, Joshi D, McMillan J, et al. Assessment of Functional Mobility After COVID-19 in Adults Aged 50 Years or Older in the Canadian Longitudinal Study on Aging. *JAMA Network Open*. 2022;5(1):e2146168-e. DOI: 10.1001/jamanetworkopen.2021.46168
91. World Health Organization. International classification of functioning, disability and health: children and youth version: ICF-CY [internet]. Geneva: World Health Organization; 2007 updated 2012 [cited 14 Apr 2022]. Available from: <https://apps.who.int/iris/handle/10665/43737>
92. Physiopedia. Physical Activity Scale for the Elderly (PASE). Physiopedia; 12 Apr 2020 [cited 14 Apr 2022]. Available from: [https://www.physio-pedia.com/index.php?title=Physical\\_Activity\\_Scale\\_for\\_the\\_Elderly\\_\(PASE\)&oldid=235382](https://www.physio-pedia.com/index.php?title=Physical_Activity_Scale_for_the_Elderly_(PASE)&oldid=235382)
93. Bohannon RW, Crouch R. 1-Minute Sit-to-Stand Test, Systematic Review of Procedures, Performance, and Clinimetric Properties. *J Cardiopulm Rehabil Prev*. 2019 Jan;39(1):2-8. DOI: 10.1097/hcr.0000000000000336
94. Greenhalgh T, Knight M, A'Court C, et al. Management of post-acute covid-19 in primary care. *BMJ*. 2020;370:m3026. DOI: 10.1136/bmj.m3026
95. Bisaccia G, Ricci F, Recce V, et al. Post-Acute Sequelae of COVID-19 and Cardiovascular Autonomic Dysfunction: What Do We Know? *J Cardiovasc Dev Dis*. 2021 Nov 15;8(11). DOI: 10.3390/jcdd8110156
96. Huang B, Yan H, Hu L, et al. The Contribution of Psychological Distress to Resting Palpitations in Patients Who Recovered from Severe COVID-19. *Int J Gen Med*. 2021;14:9371-8. DOI: 10.2147/ijgm.S334715
97. Dixit NM, Churchill A, Nsair A, et al. Post-Acute COVID-19 Syndrome and the cardiovascular system: What is known? *Am Heart J Plus*. 2021 May;5:100025. DOI: 10.1016/j.ahjo.2021.100025
98. Chew DP, Scott IA, Cullen L, et al. National Heart Foundation of Australia & Cardiac Society of Australia and New Zealand: Australian Clinical Guidelines for the Management of Acute Coronary Syndromes 2016. *Heart Lung Circ*. 2016 Sep;25(9):895-951. DOI: 10.1016/j.hlc.2016.06.789
99. NSW Ministry of Health. Pathway for acute coronary syndrome assessment (PACSA). GL2019\_014. Sydney: NSW Ministry of Health; 2019. Available from: [https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/GL2019\\_014.pdf](https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/GL2019_014.pdf)
100. Bavishi C, Bonow RO, Trivedi V, et al. Special Article - Acute myocardial injury in patients hospitalized with COVID-19 infection: A review. *Prog Cardiovasc Dis*. 2020 Sep-Oct;63(5):682-9. DOI: 10.1016/j.pcad.2020.05.013
101. Burges Watson DL, Campbell M, Hopkins C, et al. Altered smell and taste: Anosmia, parosmia and the impact of long Covid-19. *PloS one*. 2021;16(9):e0256998-e. DOI: 10.1371/journal.pone.0256998
102. Vaira LA, Gessa C, Deiana G, et al. The Effects of Persistent Olfactory and Gustatory Dysfunctions on Quality of Life in Long-COVID-19 Patients. *Life (Basel)*. 2022;12(2):141. DOI: 10.3390/life12020141
103. Gane SB, Kelly C, Hopkins C. Isolated sudden onset anosmia in COVID-19 infection. A novel syndrome? *Rhinology*. 2020 Jun 1;58(3):299-301. DOI: 10.4193/Rhin20.114
104. Whitcroft KL, Hummel T. Olfactory Dysfunction in COVID-19: Diagnosis and Management. *JAMA*. 2020 Jun 23;323(24):2512-4. DOI: 10.1001/jama.2020.8391
105. The StayWell Company. Smell and Taste Disorders [internet]. Los Angeles, USA: Cedars-Sinai; 2021 [cited 14 Apr 2022]. Available from: <https://www.cedars-sinai.org/health-library/diseases-and-conditions/s/smell-and-taste-disorders.html>
106. Kronenbuerger M, Pilgramm M. Olfactory Training. [updated 3 Jan 2022]. In: StatPearls [internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan- [cited 14 Apr 2022]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK567741>

Document information	
Version number	1
Original publication date	31 May 2022
Developed by	Rehabilitation and Respiratory Communities of Practice
Scope	The scope of this model of care is to support the transition of adult patients with COVID-19 from the acute care environment to the community. Suggested clinical pathways for discharge and follow-up care are included to support patients in the first three months (approx.) from diagnosis, regardless of severity of disease.
Consultation	A subject matter expert group, comprised of the following individuals and COPs provided input and critical review during the development of this document: Respiratory: Professor Peter Wark and Professor David Joffe Rehabilitation: Professor Steven Faux and Dr John Estell Pulmonary rehabilitation: Professor Jennifer Alison, A/Prof Lissa Spencer Primary care: Dr Martina Gleeson, Dr Kate George, Dr Walid Jammal Psychiatry: Professor Kay Wilhelm Cardiology: Dr Aravinda Thiagalingam Geriatric Medicine: Prof Vasikaran Naganathan Allied Health: Andrew Davison
Endorsed by	Nigel Lyons
Review date	
Reviewed by	
For use by	This clinical practice guide is intended for use by clinicians in primary health networks and local health districts as well as primary care practitioners across NSW who provide care to adults aged 16 years and older with a history of COVID-19 diagnosis, regardless of severity or COVID-19 variant of concern.



© State of New South Wales (Agency for Clinical Innovation) 2022.

[Creative Commons Attribution-NonCommercial 4.0 licence](https://creativecommons.org/licenses/by-nd/4.0/).

For current information go to: [aci.health.nsw.gov.au](https://aci.health.nsw.gov.au)

The ACI logo is excluded from the Creative Commons licence and may only be used with express permission.