

Post-acute/long COVID-19: p1

NICE 2020, NG188, BMJ 2020;370:m3026, BTS guidance on respiratory follow-up of patients with radiologically confirmed COVID-19 pneumonia, May 2020



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While post-acute COVID-19/long COVID-19 is increasingly reported in the literature, the evidence base for treating COVID-19 beyond 3 weeks is limited.

In December 2020, NICE issued a rapid guideline on managing the long-term effects of COVID-19; this is summarised below. Useful information from a BMJ review and BTS guidance is also included.

Key messages

- Sequelae after COVID-19 can be multi-system, fluctuate and last for prolonged periods.
- The medical profession is only just beginning to describe cases, so evidence for any interventions is extremely limited and usually based on expert consensus or anecdote.
- Don't miss other medical conditions by wrongly attributing every symptom to 'post-COVID'. Be prepared to cast your net wide as this is likely to be a diagnosis of exclusion.

Definition

Long COVID should be considered in someone who has had suspected or confirmed acute COVID-19. A positive test is not a prerequisite for considering the diagnosis since the test has a significant false negative rate. Also, community testing was not always available so a clinical diagnosis has often been made.

Acute COVID:	Signs and symptoms of COVID-19 for <4w. <i>SNOWMED CT code: Acute COVID-19 infection</i>	Most people's symptoms will resolve in the first 12w after infection.	Life-threatening complications may develop at any time: if suspected, investigate urgently.
Long COVID:	Ongoing symptomatic COVID-19: signs and symptoms of COVID-19 from 4–12w. <i>SNOWMED CT code: Ongoing symptomatic COVID-19</i>		
	Post-COVID-19 syndrome: signs and symptoms that developed during/after an infection consistent with COVID-19 that persist for >12w and are not explained by an alternative diagnosis: <ul style="list-style-type: none">• Presents with clusters of symptoms that can affect any system in the body. Symptoms can fluctuate and change with time.• Can be considered before 12w while investigating for an alternative cause for symptoms. <i>SNOWMED CT code: Post-COVID-19 syndrome</i>		

Incidence

- It is estimated that at least 10% of people have a delayed (>3-week) recovery from COVID-19 (UK COVID symptom study).
- The likelihood of long-COVID developing is not thought to be associated with the presence of any particular symptoms, the severity of the acute COVID-19 or if hospitalisation was required or not.

Causes

- Not known!
- Long-term musculoskeletal, neuropsychiatric and respiratory symptoms have been seen in other coronaviruses, e.g. SARS and MERS.
- May be multifactorial. Hypotheses include:
 - Persistent viral load due to an inadequate immune response or reinfection/reactivation.
 - Inflammatory or immune reactions.
 - Deconditioning.
 - Psychological factors, including PTSD.

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Raise awareness: provide information to all with suspected/acute COVID-19

- For those who have acute COVID-19, give information (including written information) on:
 - The normal recovery trajectory.
 - What to expect in the recovery period, e.g. common symptoms and self-management of these.
 - When/how to seek help (contact a healthcare professional).
- Written information is especially important as COVID-19 can cause cognitive symptoms (brain fog) or fatigue, affecting the ability to take in long/complex information.
- The NHS website, Your COVID Recovery, is useful: <https://www.yourcovidrecovery.nhs.uk>

Symptoms that require immediate referral

Refer immediately (same day) if suspected acute/life-threatening complication, e.g.:

- Severe hypoxaemia/oxygen desaturation on exercise.
- Signs of severe lung disease.
- Cardiac chest pain.
- Severe psychiatric symptoms/risk of suicide.
- Multisystem inflammatory syndrome in children.

Assessment of long COVID-19

If symptoms persist $\geq 4w$, arrange review in primary care.

- Review the clinical history: the episode of suspected/confirmed COVID, nature/severity/timing of symptoms, other significant health conditions. Symptoms may be wide-ranging and fluctuate with time.
- Assess impact on personal life and activities.
- Aim for continuity of care with the same professional/team.

Screening questionnaires are being used in practice but none are validated for this use. NICE gives two examples: the Yorkshire rehab questionnaire and the Newcastle screening tool. If used, they should be used as an adjunct to the consultation only.

Investigations

Long COVID is a diagnosis of exclusion:

- **Be guided by presenting symptoms.**
- **Think hard about what other conditions may be causing symptoms.**
- **Investigate any red flag symptoms/signs which may be due to an alternative diagnosis as appropriate.**

The following are suggested if new/ongoing symptoms $\geq 4w$ after the start of suspected/confirmed COVID-19.

- Bloods:
 - Full blood count, renal and liver function, CRP and thyroid function.
 - BNP (for heart failure).
 - Ferritin (to assess for inflammation and pro-thrombotic state).
 - The BMJ also mentions troponin (ACS or myocarditis suspected, but if ACS is a possibility, admission is indicated) and D-dimer (thromboembolism). D-dimer and troponin are reassuring if negative, but false positives may create clinical uncertainty.
- If appropriate, NICE suggests offering an 'exercise tolerance test' (this is not an ECG treadmill test!), e.g. 1-minute sit-to-stand test. During 1 minute of exercise, record breathlessness, pulse and oxygen saturations.
- If postural symptoms, e.g. palpitations or dizziness on standing, check lying and standing blood pressure and heart rate:
 - NICE suggests a 3-minute active stand test (or 10 minutes if postural tachycardia syndrome/autonomic dysfunction suspected). This involves lying the patient down and checking BP/HR, then standing them up and measuring BP and HR on standing and at intervals up to 3 minutes (or 10 minutes).
- CXR: offer by 12w after acute COVID-19 if continued respiratory symptoms:
 - A plain CXR may not be sufficient to rule out lung disease.
 - Ongoing respiratory symptoms with a normal CXR may still be significant; refer if concerned.
- The BMJ article also suggests a urine and ECG.

Post-acute/long COVID-19: p3

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Management: supported self-monitoring

- For patients with long COVID (symptoms $\geq 4w$), consider supported self-monitoring at home, e.g. heart rate, blood pressure and pulse oximetry.
- Provide clear information about when to seek medical attention (depending on symptoms or parameters).
- Self-monitoring may be beneficial for some but has the potential to cause anxiety.

Follow-up for patients who were admitted to hospital

For ANY patient who has been hospitalised with COVID-19, secondary care should offer a video/phone follow-up consultation 6w post-discharge.

Long COVID: ongoing care and onwards referral

Depending on the presenting symptoms, management may include:

- Immediate, on-the-day referral for red flag symptoms or signs.
- Advice on self-management.
- Onwards referral:
 - Support from primary care services, community services and/or community mental health services.
 - Referral to a specialist for specific complications, or paediatric referral if a child.
 - Referral to an integrated multidisciplinary assessment service. NICE says to consider from $\geq 4w$ after the onset of suspected/confirmed acute COVID-19 (after ruling out alternative diagnoses).

Services will differ significantly around the country and will be rapidly evolving. NICE suggests an integrated multidisciplinary assessment service should:

- Include occupational therapies, physiotherapists, clinical psychology/psychiatry and rehabilitation medicine.
- Consider physical, psychological and psychiatric rehabilitation, and work with the person to develop a personalised rehabilitation and management plan.
- Include symptom management, e.g. advice on breathlessness, brain fog and fatigue (commonly-reported long-term symptoms). Symptom diaries and symptom tracking apps are thought to be valuable in self-monitoring, although no specific apps or resources have been recommended.

Useful websites

- The NHS has produced a website for patients, offering advice about symptom control, getting back to normal activities and coping with some of the longer-term symptoms: <https://www.yourcovidrecovery.nhs.uk/>. This includes a section on managing breathlessness and some techniques to control breathing, such as square breathing.
- Skin patterns associated with COVID-19: <https://covidskinsigns.com>
- Screening questions to consider as an adjunct in the consultation:
 - Yorkshire rehab questionnaire: <https://www.acnr.co.uk/2020/06/c19-yrs/>
 - Newcastle screening tool (Appendix B): <https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/11/C0840-national-guidance-for-post-covid-syndrome-assesment-clinics-111220.pdf>
- Returning to work: guidance for patients with long COVID: https://www.fom.ac.uk/wp-content/uploads/longCOVID_guidance_03_small.pdf?fbclid=IwAR1G6uubK_F4KYIM5VddkRX6V_GzOmTQwVjw5ifWw5OpaYz1e9ETlwdgc20

Post-acute/long COVID: managing specific symptoms, 1 of 3

Typical presentations and management

Always ensure management of comorbidities is optimised.

General 'non-specific symptoms', including:

- Tiredness.
 - Fever.
 - Pain.
- Offer a holistic assessment of the whole picture; in particular, look for other diagnoses or post-COVID-19 complications.
 - Offer symptomatic management, where appropriate.
 - An empathic consulting style and hearing the person's story is likely to be beneficial, sharing the frustration of uncertainty.
 - For many (but not all), significant improvement in symptoms occurs with 4–6 weeks of light aerobic activity, e.g. walking, yoga.
 - Advice can be offered on pacing activity, goal-setting and general wellbeing.
 - Offer support with a phased return to employment/amended duties, if applicable (see useful websites box).
 - It is not known if over-the-counter vitamins/supplements help.
 - Vitamin D is currently not recommended to prevent or treat COVID-19. Follow the Public Health England advice on vitamin D supplementation for the general population (NICE 2020, NG 187).

Fatigue

- Can be profound and share features with CFS/ME and fatigue reported after other infections.
- No evidence for drug or non-drug interventions in managing post-COVID fatigue.
 - Conflicting opinions about graded exercise. The BMJ article recommends exercise should be undertaken with 'caution' and stopped if the person develops fever/severe fatigue or muscle pain.

Mental health

A minority of people, often healthcare workers, may have features of PTSD, which include:

- Re-experiencing traumatic events, e.g. intrusive memories, flashbacks or nightmares.
 - Strong overwhelming emotions/physical sensations.
 - Attempts to avoid thoughts/memories and reminders.
 - Hypervigilance and exaggerated startle reflex.
- Post-acute COVID-19 has been associated with:
- Anxiety.
 - Low mood.
 - Depression.
 - Poor sleep.
- Assess the severity and functional impact of mental health problems, and manage holistically.
 - Remember, tools such as PHQ-9 are designed for use in people who are *physically well*, and physical illness may impact on the score.
 - Many people will not need medication or a mental health referral, and will benefit from supportive empathic consultations.
 - Consider broader issues where possible, e.g. social connection, wellbeing, nutrition, hydration, self-care – as we would normally!
 - If functional impact, consider appropriate psychological or drug treatment and, if necessary, referral:
 - Refer immediately if severe psychiatric symptoms/risk of suicide.
 - Refer urgently if risk of self-harm or severe psychiatric symptoms that don't need immediate referral.
 - If you suspect PTSD, see the separate article on this in the online handbook.

Post-acute/long COVID: managing specific symptoms, 2 of 3

Persistent respiratory symptoms

- Persistent cough.
- Breathlessness.

Mild breathlessness is common: manage with breathing exercises (see below). Consider home pulse oximetry.

Offer assessment if:

- Progressive or new respiratory symptoms (BTS guidance).
- Pulse oximeter readings persistently $<96\%$ PaO₂ (assuming normal saturations pre-COVID) require further assessment/investigation (BMJ 2020;370:m3026).

Prescribe antibiotics only if bacterial superinfection is suspected.

Has a chest X-ray been carried out?

- NICE says offer by 12w after acute COVID if continued respiratory symptoms:
 - May have been managed in the community so far and not had a CXR yet.
 - If hospitalised, may require a follow-up CXR post-discharge.
- Refer if CXR abnormal, e.g. indicative of pulmonary fibrosis or pulmonary vascular disease (it is likely that a CTPA, CT and ECHO will then be arranged).
- Ongoing respiratory symptoms with a normal CXR may still be significant; consider onwards referral.

NICE makes no other specific suggestions about referral. BTS suggests to refer if:

- Severe breathlessness, to detect and manage rarer complications, including:
 - Pulmonary fibrosis.
 - Pulmonary vascular disease, such as pulmonary hypertension.

Breathing exercises and pulmonary rehabilitation

- Breathing exercises may be beneficial for persistent breathlessness, e.g. *sit in a supported position and breath in through the nose and out through the mouth in a 1:2 inspiratory to expiratory ratio. This should be done regularly throughout the day in 5–10-minute bursts.*
- Early referral to pulmonary rehabilitation (after 6 weeks but before 12 weeks) is 'probably' beneficial for this group. Spontaneous ongoing recovery and improvement is common in the first 6 weeks.

Thromboembolism

- COVID-19 increases the risk of venous thromboembolism.
- Hospitalised patients receive prophylactic anticoagulation, and may be discharged with up to 10 days further prophylaxis.
- We do not know the incidence in community COVID-19 patients.

- Have a lower threshold to suspect VTE.
- Consider VTE in patients with increasing or acute breathlessness, tachycardia, chest pain, persisting or deteriorating hypoxia or features of a DVT. Assess and refer as normal (you may want to refer to the Red Whale GEMS on NICE on VTE).
- Patients who have had a thrombotic episode will remain on anticoagulation following standard guidelines (see NICE VTE/PE).

Post-acute/long COVID: managing specific symptoms, 3 of 3

Cardiac

20% of people **admitted** with COVID-19 have clinically-apparent cardiac involvement, and a greater proportion may have undetected cardiac involvement.

We do not know the prevalence in those who remained in the community.

Cardiac symptoms associated with COVID-19 include chest tightness/pain and palpitations. Refer/investigate as usual.

Cardiac complications are more common in those with pre-existing cardiac disease but are also seen in those previously fit and well.

Specific reported complications include:

- Myocarditis.
- Pericarditis.
- Myocardial infarction.
- Arrhythmias.

- **If you suspect ACS, do not do troponin in the community: ADMIT!**
- Refer if **clinically-significant** cardiac disease is suspected.
- Assess and investigate chest pain, considering cardiac, MSK and respiratory causes. The BMJ article suggests that an ECG may be helpful, as may CK/BNP/troponin if myocarditis/pericarditis are suspected.
- People diagnosed with myocarditis/pericarditis should avoid 'intense' cardiovascular exercise for at least 3 months, and high-level athletes will require a cardiology assessment prior to return to sport.

Neurological symptoms:

- Cognitive impairment, brain fog, loss of concentration.
- Headache.
- Sleep disturbance.
- Peripheral neuropathy.
- Dizziness.

Neurological complications

- Ischemic stroke.
- Seizures.
- Encephalitis.
- Cranial nerve neuropathies.

- **Symptoms:** If someone presents with new cognitive impairment, use a validated screening tool to assess.
- **Complications:** refer with appropriate urgency!

Older people

May be particularly susceptible to:

- Sarcopenia (loss of skeletal muscle mass and function).
- Anorexia, reduced appetite and malnutrition.
- Depression.
- Delirium.
- Post-COVID-19 chronic pain.

- Gradual decline, deconditioning, loss of appetite, worsening frailty or dementia after suspected/confirmed COVID-19 can be signs of long COVID, BUT can also be signs of other significant pathology.
- An MDT approach is likely to be beneficial, including community rehabilitation teams and social care.
- Older people may need additional support, e.g. short-term care packages, advanced care planning or support with social isolation, loneliness or bereavement.

Other symptoms mentioned by NICE but for which no specific management is suggested:

MSK: joint, muscle pain.

Gastrointestinal: abdominal pain, nausea, diarrhoea.

ENT: tinnitus, earache, sore throat, dizziness, loss of taste/smell.

Dermatological: skin rashes.