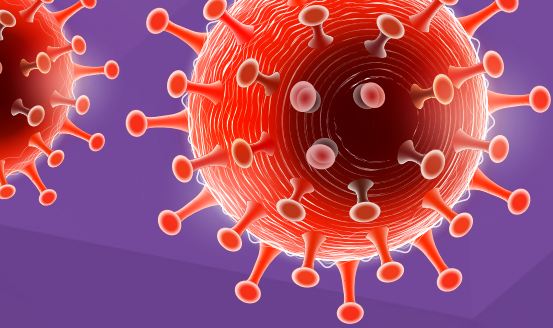


# Long COVID

*Laboratory investigations to support management of patients presenting with Long COVID syndrome.*





# Laboratory investigations to support management of patients presenting with “Long COVID”

By Associate Professor Chris Barnes

*Most people infected with COVID-19 will fully recover within a few weeks of infection. In a study of almost 3000 patients with COVID-19 infection from NSW, 80% of patients had fully recovered by 30 days; however, up to 5% of patients will continue to have symptoms beyond 12 weeks following infection.<sup>1</sup>*

There is no agreed definition of “Long COVID” syndrome. The **WHO** has provided a clinical case definition for “post COVID-19 condition”. This definition includes patients with a range of potentially overlapping and intermittent symptoms including fatigue, shortness of breath and cognitive dysfunction that impact everyday functioning. The symptoms extend beyond 12 weeks from COVID-19 infection and are present for at least 2 months.<sup>2</sup> There is limited understanding of the pathogenesis and risk factors for patients developing Long COVID.

There is an absence of well-established evidence-based guidelines for the investigation and management of patients presenting with potential Long COVID. Clinicians may be faced with the diagnostic and management dilemma of how best to approach patients suspected of having Long COVID syndrome. Tertiary referral centres are being inundated with patients suspected of having Long COVID syndrome with patients being forced to wait up to one year before being seen.<sup>3</sup>

Clinical assessment of patients presenting with symptoms suggestive of Long COVID syndrome can be difficult. Symptoms can be varied and overlapping – often without objective clinical signs. The **NICE** guideline on Long COVID includes commonly reported symptoms which can be classified as below.<sup>4</sup>

## Commonly reported “Long COVID” symptoms

Respiratory / ENT and Cardiovascular symptoms	Gastrointestinal symptoms
<ul style="list-style-type: none"> <li>Breathlessness</li> <li>Cough</li> <li>Cardiovascular symptoms</li> <li>Chest tightness</li> <li>Chest pain</li> <li>Palpitations</li> </ul>	<ul style="list-style-type: none"> <li>Abdominal pain</li> <li>Nausea</li> <li>Diarrhoea</li> <li>Weight loss and reduced appetite</li> </ul>
Generalised and Neurological symptoms	Musculoskeletal / skin symptoms
<ul style="list-style-type: none"> <li>Fatigue</li> <li>Fever</li> <li>Pain</li> <li>Cognitive impairment (‘brain fog’, loss of concentration or memory issues)</li> <li>Headache</li> <li>Sleep disturbance</li> <li>Symptoms of anxiety</li> </ul>	<ul style="list-style-type: none"> <li>Joint pain</li> <li>Muscle pain</li> <li>Skin rashes</li> <li>Hair loss</li> </ul>
<ul style="list-style-type: none"> <li>Tinnitus</li> <li>Earache</li> <li>Sore throat</li> <li>Dizziness</li> <li>Loss of taste and/or smell</li> <li>Nasal congestion</li> </ul>	
	<ul style="list-style-type: none"> <li>Peripheral neuropathy symptoms (pins and needles and numbness)</li> <li>Delirium (in older populations)</li> <li>Mobility impairment</li> <li>Visual disturbance</li> <li>Symptoms of depression</li> <li>Symptoms of post-traumatic stress disorder</li> </ul>

In the setting of high clinical demands, self-report questionnaires have been proposed as a potential guide to support clinical decision-making. The **Symptom Burden Questionnaire™ for Long COVID (SBQ™-LC)** is a comprehensive patient-reported outcome tool measuring the frequency and severity of symptoms in patients with Long COVID.<sup>5</sup> This questionnaire highlights the varied range of symptoms of patients presenting with Long COVID and includes 17 independent scales with a summed raw score which can be transformed to a linear (0-100) score with higher scores associated with higher disease burden.

## Recommended laboratory investigations

Targeted laboratory investigations are essential in supporting the assessment of patients presenting with symptoms suggestive of Long COVID. It is important to acknowledge that the variety of potential symptoms of patients presenting with Long COVID may make excluding underlying medical conditions difficult. Additionally, comorbidities that require targeted therapy may compound symptoms of Long COVID. The approach below is suggested to support the investigation of patients presenting with potential Long COVID with an initial baseline series of investigations followed by a more targeted methodology directed towards the patients' symptoms.

Baseline investigations		
<ul style="list-style-type: none"> <li>• Full blood count</li> <li>• Kidney and liver function tests</li> <li>• C-reactive protein</li> <li>• Iron studies</li> </ul>	<ul style="list-style-type: none"> <li>• Vitamin B12</li> <li>• EBV and CMV serology</li> <li>• Beta HCG if appropriate</li> <li>• ESR</li> </ul>	<ul style="list-style-type: none"> <li>• Thyroid function</li> <li>• HbA1c</li> <li>• Immunoglobulins</li> </ul>

### PATIENTS PRESENTING WITH:

Respiratory / ENT and Cardiovascular symptoms	Generalised and Neurological symptoms	Gastrointestinal symptoms	Musculoskeletal / skin symptoms
<ul style="list-style-type: none"> <li>• Troponin</li> <li>• ECG / 24 Holter monitor</li> <li>• B-type natriuretic peptide (BNP)</li> <li>• Chest X-ray</li> </ul>	<ul style="list-style-type: none"> <li>• Blood culture (if fever present)</li> <li>• Hormonal profile (e.g. fasting testosterone)</li> <li>• Serum protein electrophoresis</li> <li>• Calcium, magnesium and phosphate</li> <li>• Cortisol and ACTH levels</li> </ul>	<ul style="list-style-type: none"> <li>• Faecal calprotectin</li> <li>• Coeliac screen</li> <li>• Breath hydrogen test</li> <li>• Faecal MCS</li> <li>• Lipase and amylase</li> <li>• Urine MCS</li> </ul>	<ul style="list-style-type: none"> <li>• ANA / ENA / DsDNA</li> <li>• Creatine kinase</li> </ul>

## References

1. Liu B, Jayasundara D, Pye V, Dobbins T, Dore GJ, Matthews G, et al. Whole of population-based cohort study of recovery time from COVID-19 in New South Wales Australia. (2666-6065 (Electronic)).
2. WHO. A clinical case definition of post COVID-19 condition by a Delphi consensus, 6 October 2021 2021 [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)].
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5. Hughes SE, Haroon S, Subramanian A, McMullan C, Aiyegbusi OL, Turner GM, et al. Development and validation of the symptom burden questionnaire for long covid (SBQ-LC): Rasch analysis. BMJ. 2022;377:e070230.

## ABOUT THE AUTHOR



### Assoc. Prof. Chris Barnes

MBBS FRACP FRCPA

**Lab:** Clayton

**Speciality:** Haematology

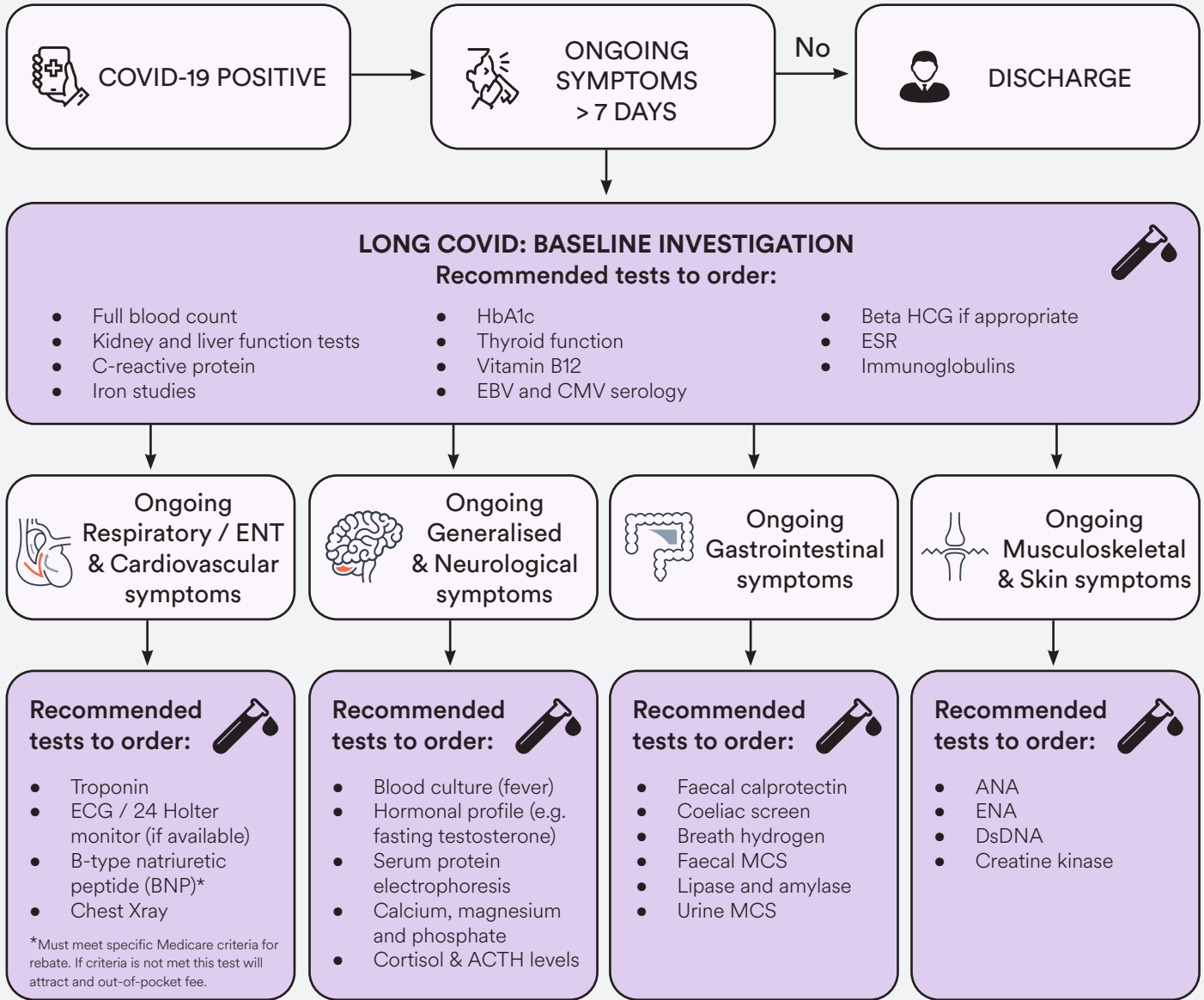
**Areas of Interest:** Paediatric haematology, non-malignant haematological conditions including thrombosis and bleeding disorders

**Phone:** (03) 9538 6777

**Email:** [chris.barnes@clinicallabs.com.au](mailto:chris.barnes@clinicallabs.com.au)

Associate Professor Chris Barnes is the National Director of Haematology and provides strategic direction nationally for haematology at Clinical Labs. He is a clinical and laboratory-trained haematologist who has been part of Melbourne Haematology and has worked with Clinical Labs (and previously Healthscope) for several years. A/Prof Barnes also works at the Royal Children's Hospital and is director of the Haemophilia Treatment Centre. He has experience in both management and leadership positions. A/Prof Barnes has an active clinical research interest and is also director of Melbourne Haematology (Clinical) and Melbourne Paediatric Specialists.

# Summary of Long COVID investigative recommendations



## Single-click ordering of Long COVID Test Profiles with Orders

ONLY AVAILABLE WITH



For clinics using **Best Practice**, **MedicalDirector Clinical** or **Clinical Labs**'

Instead of adding each test individually, click through to our eOrders screen and navigate to 'Clinical Recommendations' (MD) or 'Clinical details' (BP), where you will find the Long COVID test profiles described above pre-configured, and can be ordered with the click of a button. Test profiles can also be searched for via the main eOrders search bar.

LONG COVID: Baseline 11 tests

LONG COVID: Resp/ENT/Cardio Symptoms 2 tests

LONG COVID: Gen & Neuro Symptoms 12 tests

LONG COVID: Gastro Symptoms 9 tests

LONG COVID: Musculoskeletal & Skin Symptoms 4 tests