In brief

Post acute sequelae of COVID-19 (long COVID)

1 April 2022

In brief

Definition

- The World Health Organization defines post acute sequelae of COVID-19 (PASC), or long COVID, as “[the] condition that occurs in individuals with a history of probable or confirmed SARS CoV-2 infection, usually 3 months from the onset of COVID-19 with symptoms and that last for at least 2 months and cannot be explained by an alternative diagnosis. Common symptoms include fatigue, shortness of breath, cognitive dysfunction but also others and generally have an impact on everyday functioning. Symptoms may be new onset following initial recovery from an acute COVID-19 episode or persist from the initial illness. Symptoms may also fluctuate or relapse over time.”

- The global estimated pooled PASC prevalence ranges from 43% to 63%, with a higher pooled PASC prevalence estimate among those hospitalised during the acute phase of infection. The incidence and evolution of PASC are dependent on factors including vaccination status, variant of the virus, and geographic region. Diagnosis of PASC is generally made by exclusion.

Risk factors

- Risk factors for the development of PASC include symptomatic COVID-19 infection, hospitalisation, and severity of illness. Other potential risk factors include old age, female sex, a high number of comorbidities, and moderate and severe obesity.

- Vaccination with at least two doses of a COVID-19 vaccine is associated with a substantial decrease in reporting of PASC. 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 were approximately halved by having two vaccine doses. A preprint from the United States reported that 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 with unvaccinated patients.

- Accurately determining the risk of PASC in children and adolescents has been difficult. The prevalence of PASC in children has been reported as ranging from 0% to 44.8%.

- Risk factors associated with PASC in children include allergies, asthma, eczema and one or more pre-existing conditions.

Symptoms and diagnosis

- More than 100 persistent symptoms of COVID-19 have been reported in the literature. Whilst some symptoms are specific to different points in time following acute illness (Table 1), fatigue, dyspnoea and smell or taste impairment, and neurological and cardiovascular impairment have been reported for up to 12 months.

- Two systematic reviews pre-Omicron reported that the number of people experiencing at least one post COVID-19 condition symptom 30 days after onset or hospitalisation was 45.9% and at six...
months or more was 54%. A preprint study found that approximately 50% of people reported persistence of at least one symptom at 12 month follow up. A preprint study found that approximately 50% of people reported persistence of at least one symptom at 12 month follow up.22

- Medium- and long-term pathophysiology across organ systems remains unclear and a diagnosis of PASC is generally made by exclusion.23 There is neither a definitive test to diagnose PASC nor a single treatment or medication.
- Routine follow up and symptom assessment of PASC generally includes a comprehensive clinical history and appropriate examination that involves assessing physical, cognitive, psychological and psychiatric symptoms, as well as functional abilities.24, 25

Treatment

- Robust evidence on treating PASC is lacking. One randomised controlled trial demonstrated that a six-week rehabilitation program (involving breathing, stretching and home exercises) improved lung function, exercise capacity, quality of life and anxiety, but not depression.26
- Pulmonary rehabilitation has been associated with improvements in exertional dyspnoea, physical capacity, quality of life, fatigue, and depression.27
- Management of PASC is not well defined and is generally based on the management of symptoms following similar illnesses. Existing guidance includes self-management and multidisciplinary rehabilitation approach.24, 28, 29
- The United Kingdom National Institute for Health and Care Excellence and UpToDate have published guidance on evaluation and management of complications and persistent COVID-19 symptoms.30, 31

Variants

- There is limited evidence on the role of different variants, including Omicron, and developing PASC.22, 32

Table 1: PASC symptoms

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<tr>
<th>Time period</th>
<th>Symptoms</th>
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| One month   | 63.2% of COVID-19 survivors had one or more symptoms 30 days after onset or hospitalisation.  
The most frequent symptoms include cough, loss of smell or taste, dyspnoea, fatigue, and confusion.4 |
| Three months | 55% of COVID-19 survivors reported not feeling fully recovered from COVID-19 at three months post-discharge, and 93% reported persistent or new symptoms.17  
The most common symptoms were fatigue, dyspnoea, muscle and joint pain, loss of smell or taste, and problems sleeping.17  
There have also been reports of cardiac sequelae, neurologic symptoms, psychosocial symptoms and diabetic ketoacidosis.25, 33-35 |
| Six months  | 54% of people experience at least one PASC symptom at six months.3  
Commonly reported symptoms include fatigue, post exertional malaise and cognitive dysfunction.  
Decreased lung function, respiratory symptoms, muscle weakness, sleeping difficulties, decreased quality of life, loss of taste and smell, dyspnoea, pain, discomfort, anxiety and depression are also reported. 18, 36-38  
In children, prevalence of PASC ranged from as low as 1% to 45%.12-14, 39-41 |
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### Time period | Symptoms
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Twelve months | • Approximately 50% of people reported persistence of at least one symptom at 12 month follow up, most commonly fatigue, followed by smell or taste impairment.\(^{19}\)
| | • PASC symptoms decreased from 68% to 49% between 6 and 12 months, and more patients had anxiety or depression at 12 months compared with 6 months.\(^{42}\)
| | • At 12-months post-hospitalisation for severe COVID, 87% of patients had ongoing abnormalities in functional, cognitive or Neuro-QoL metrics.\(^{20,43,44}\)
| | • A study in the United States, has found SARS-CoV-2 can cause cardiovascular problems for up to a year, not just during the acute phase.\(^{21}\)

The Critical Intelligence Unit maintains a living evidence table on post-acute sequelae of COVID-19 which was used to inform this brief with supplementary searches PubMed and Google searches on 8 and 9 March 2022.

### References


In brief documents are not an exhaustive list of publications but aim to provide an overview of what is already known about a specific topic. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.
COVID-19 Critical Intelligence Unit: Post acute sequelae of COVID-19 (long COVID)


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