

In brief

Post-acute sequelae of COVID-19

3 December 2021

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- The [World Health Organization](#) defines post-acute sequelae of COVID-19 (PASC) 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 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.*”¹
- 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.²⁻⁴
- Risk factors for the development of PASC may include those who had 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.⁵
- Whilst some symptoms are specific to different points in time following acute illness (table one), fatigue, dyspnoea and smell or taste impairment are consistently reported for twelve months.⁶⁻⁸
- 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.^{9, 10} Referral to an evaluation in a specialised outpatient COVID-19 recovery clinic for patients with persistent symptoms lasting beyond 12 weeks.¹¹
- Management of these conditions is not well defined and is generally based on the management of symptoms following similar illnesses. Existing guidance includes self-management and multidisciplinary approach.^{9, 12, 13} Pulmonary rehabilitation has shown improvements in exertional dyspnoea, physical capacity, quality of life (QoL) , fatigue, and depression.¹⁴
- 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.¹⁵ A preprint from 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 long-COVID symptoms, compared to unvaccinated patients.¹⁶

Table one: PASC symptoms

Time period	Symptoms
One month	63.2% of COVID-19 survivors had one or more symptoms 30 days after onset / hospitalisation. The most frequent symptoms are cough, loss of smell or taste, dyspnoea, fatigue, and confusion. ³
Three months	A cohort study found 55% reported not feeling fully recovered from COVID-19 at 3 months post-discharge, and 93% reported persistent or new symptoms. ⁶ The most

Time period	Symptoms
	common symptoms were fatigue, dyspnoea, muscle and joint pain, loss of smell or taste, and problems sleeping. ⁶ There have also been reports of cardiac sequelae, neurologic symptoms, psychosocial symptoms and case reports of diabetic ketoacidosis reported. ^{10, 17-19}
Six months	54% of people experience at least one PASC symptom at 6 months. ⁴ Commonly reported symptoms include fatigue, post exertional malaise and cognitive dysfunction. Persistent chest CT abnormalities, 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. ^{7, 20-22} In children, prevalence of PASC ranged from as low as 1% to 45%. ²³⁻²⁸
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. ⁸ 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. ²⁹

The Critical Intelligence Unit maintains a living evidence table on [PASC](#) which was used to inform this brief with supplementary searches as required.

References

1. World Health Organization. A clinical case definition of post COVID-19 condition by a Delphi consensus, 6 October 2021 [Internet] Switzerland: WHO; 6 Oct 2021 [accessed on 22 Nov 2021] Available from: https://www.who.int/publications/i/item/WHO-2019-nCoV-Post_COVID-19_condition-Clinical_case_definition-2021.1
2. Chen C, Hauptert SR, Zimmermann L, et al. Global Prevalence of Post-Acute Sequelae of COVID-19 (PASC) or Long COVID: A Meta-Analysis and Systematic Review. medRxiv. 2021:2021.11.15.21266377. DOI: 10.1101/2021.11.15.21266377
3. Fernández-de-Las-Peñas C, Palacios-Ceña D, Gómez-Mayordomo V, et al. Prevalence of post-COVID-19 symptoms in hospitalized and non-hospitalized COVID-19 survivors: A systematic review and meta-analysis. Eur J Intern Med. 2021 Oct;92:55-70. DOI: 10.1016/j.ejim.2021.06.009
4. 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 Oct 1;4(10):e2128568. DOI: 10.1001/jamanetworkopen.2021.28568
5. Baratta JM, Tompany A, Siano S, et al. Postacute Sequelae of COVID-19 Infection and Development of a Psychiatry-Led Recovery Clinic. Am J Phys Med Rehabil. 2021 Jul 1;100(7):633-4. DOI: 10.1097/phm.0000000000001778
6. Sigfrid L, Drake TM, Pauley E, et al. Long Covid in adults discharged from UK hospitals after Covid-19: A prospective, multicentre cohort study using the ISARIC WHO Clinical Characterisation Protocol. Lancet Reg Health Eur. 2021 Sep;8:100186. DOI: 10.1016/j.lanepe.2021.100186
7. Davis HE, Assaf GS, McCorkell L, et al. Characterizing long COVID in an international cohort: 7 months of symptoms and their impact. EClinicalMedicine. 2021 Aug;38:101019. DOI: 10.1016/j.eclinm.2021.101019
8. Boscolo-Rizzo P, Guida F, Polesel J, et al. Long COVID In Adults at 12 Months After Mild-to-Moderate SARS-CoV-2 Infection. medRxiv. 2021:2021.04.12.21255343. DOI: 10.1101/2021.04.12.21255343

9. National Institute for Health and Care Excellence. COVID-19 rapid guideline: managing the long-term effects of COVID-19 [Internet] United Kingdom: NICE; 11 Nov 2021 [cited 22 Nov 2021]. Available from: <https://www.nice.org.uk/guidance/ng188>
10. Nalbandian A, Sehgal K, Gupta A, et al. Post-acute COVID-19 syndrome. *Nature Medicine*. 2021 2021/04/01;27(4):601-15. DOI: 10.1038/s41591-021-01283-z
11. UpToDate. COVID-19: Evaluation and management of adults following acute viral illness [Internet] United States: UpToDate; 10 Nov 2021 [cited 22 Nov 2021] Available from: <https://www.uptodate.com/contents/covid-19-evaluation-and-management-of-adults-following-acute-viral-illness>
12. Herrera JE, Niehaus WN, Whiteson J, et al. Multidisciplinary collaborative consensus guidance statement on the assessment and treatment of fatigue in postacute sequelae of SARS-CoV-2 infection (PASC) patients. *PM R*. 2021 Sep;13(9):1027-43. DOI: 10.1002/pmrj.12684
13. Décary S, Dugas M, Stefan T, et al. Care Models for Long COVID : A Rapid Systematic Review. *medRxiv*. 2021:2021.11.17.21266404. DOI: 10.1101/2021.11.17.21266404
14. Hayden MC, Limbach M, Schuler M, et al. Effectiveness of a Three-Week Inpatient Pulmonary Rehabilitation Program for Patients after COVID-19: A Prospective Observational Study. *Int J Environ. Res. Public Health*. 2021 Aug 26;18(17). DOI: 10.3390/ijerph18179001
15. 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
16. 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
17. Xiong Q, Xu M, Li J, et al. Clinical sequelae of COVID-19 survivors in Wuhan, China: a single-centre longitudinal study. *Clin Microbiol Infect*. 2021 Jan;27(1):89-95. DOI: 10.1016/j.cmi.2020.09.023
18. Ramadan MS, Bertolino L, Zampino R, et al. Cardiac sequelae after coronavirus disease 2019 recovery: a systematic review. *Clin Microbiol Infect*. 2021 Sep;27(9):1250-61. DOI: 10.1016/j.cmi.2021.06.015
19. 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
20. Sanchez-Ramirez DC, Normand K, Zhaoyun Y, et al. Long-Term Impact of COVID-19: A Systematic Review of the Literature and Meta-Analysis. *Biomedicines*. 2021 Jul 27;9(8). DOI: 10.3390/biomedicines9080900
21. Anaya JM, Rojas M, Salinas ML, et al. Post-COVID syndrome. A case series and comprehensive review. *Autoimmun Rev*. 2021 Nov;20(11):102947. DOI: 10.1016/j.autrev.2021.102947
22. Huang C, Huang L, Wang Y, et al. 6-month consequences of COVID-19 in patients discharged from hospital: a cohort study. *Lancet*. 2021 Jan 16;397(10270):220-32. DOI: 10.1016/s0140-6736(20)32656-8
23. Lewis D. Long COVID and kids: scientists race to find answers. *Nature*. 2021 Jul;595(7868):482-3. DOI: 10.1038/d41586-021-01935-7
24. Wise J. Long covid: One in seven children may still have symptoms 15 weeks after infection, data show. *BMJ*. 2021 Sep 1;374:n2157. DOI: 10.1136/bmj.n2157
25. Sterky E, Olsson-Åkefeldt S, Hertting O, et al. Persistent symptoms in Swedish children after hospitalisation due to COVID-19. *Acta Paediatr*. 2021 Sep;110(9):2578-80. DOI: 10.1111/apa.15999
26. Asadi-Pooya AA, Nemati H, Shahisavandi M, et al. Long COVID in children and adolescents. *World J Pediatr*. 2021 Oct;17(5):495-9. DOI: 10.1007/s12519-021-00457-6
27. Buonsenso D, Munblit D, De Rose C, et al. Preliminary evidence on long COVID in children. *Acta Paediatr*. 2021 Jul;110(7):2208-11. DOI: 10.1111/apa.15870

28. Radtke T, Ulyte A, Puhan MA, et al. Long-term Symptoms After SARS-CoV-2 Infection in Children and Adolescents. JAMA. 2021 Jul 15;326(9):869-71. DOI: 10.1001/jama.2021.11880
29. Huang L, Yao Q, Gu X, et al. 1-year outcomes in hospital survivors with COVID-19: a longitudinal cohort study. Lancet. 2021 Aug 28;398(10302):747-58. DOI: 10.1016/s0140-6736(21)01755-4

SHPN: (ACI) 211055 | TRIM: ACI/D21/695-58 | Edition 1