



COVID-19

Future Directions and Resources


Evaluating and Caring for Patients with Post-COVID Conditions: Interim Guidance

Updated June 14, 2021 [Print](#)

PAGE 8 of 8

[< View Table of Contents](#)





Future Directions

Research is underway to define the post-acute and long-term phases of COVID-19, and to distinguish health effects exclusively related to infection with SARS-CoV-2 from consequences of hospitalization, and from medical procedures and treatments required for care of people with severe disease of any etiology (e.g., post-intensive care syndrome). The natural history of SARS-CoV-2 infection and COVID-19-related illnesses is a current area of investigation, and the prevalence, type, duration, and severity of persistent symptoms following resolution of acute SARS-CoV-2 infection, as well as risk factors associated with their development, continue to be studied. CDC has also partnered with the National Institute of Health (NIH), aligning efforts within the federal government to support the [PASC initiative](#) .



Knowledge of post-COVID conditions is likely to change rapidly with ongoing research. Healthcare professionals and patients should continue to check for updates on evolving guidance for post-COVID conditions. CDC will continue to work in collaboration with federal, state, local, academic, and community partners to better understand the long-term effects of SARS-CoV-2 infection, and this guidance will be updated as new information emerges.

Resources

Support Groups

- [Body Politic](#) 
- [Survivor Corps](#) 
- [Long COVID Alliance](#) 
- [Long COVID Kids](#) 

Symptom and Condition Assessments

- [Measuring orthostatic blood pressure](#)
- [Health measures toolbox](#) 
- [AAPM&R functional assessments](#) 

Other Tools and Resources

- [The Accountable Health Communities Health-Related Social Needs Screening Tool](#) 
- [Tools for providing trauma-informed care](#)
- [Tools for cross-cultural communication](#)
- [AAPM&R Long COVID \(PASC\) resources](#) 
- [AAFP Social Determinants of Health resources](#) 

Acknowledgements

- **CDC COVID-19 Response's Post-COVID Conditions Unit**
- **External Post-COVID Condition Experts:** Kathleen Bell MD, Jean Marie Connors MD, Jill Foster MD, Dixie Harris MD, Jonathan Himmelfarb MD, Judith James MD PhD, Nomi Levy-Carrick MD MPhil, Mitchell Miglis MD, Allison Navis MD, Jennifer Possick MD, Wendy S. Post MD MS, Peter Rowe MD, Bazak Sharon MD

Table of Contents

Key Points

Background

General Clinical Considerations

Patient History and Physical Exam

Assessment and Testing

Management of Post-COVID Conditions

Public Health Recommendations

› **Future Directions and Resources**

References

See All References



1. Nalbandian A, Sehgal K, Gupta A, Madhavan MV, et al. Post-acute COVID-19 syndrome. *Nat Med*. 2021 Apr;27(4):601-615. doi:10.1038/s41591-021-01283-z [↗](#)
2. Policy Brief 39 – In the Wake of the Pandemic Preparing for Long COVID. Accessed at: <https://apps.who.int/iris/bitstream/handle/10665/339629/Policy-brief-39-1997-8073-eng.pdf> [↗](#)
3. Huang Y, Pinto MD, Borelli JL, et al. COVID Symptoms, Symptom Clusters, and Predictors for Becoming a Long-Hauler: Looking for Clarity in the Haze of the Pandemic. *medRxiv*. 2021 Mar 5. doi: 10.1101/2021.03.03.21252086 [↗](#)
4. Havervall S, Rosell A, Phillipson M, Mangsbo SM, Nilsson P, Hober S, Thålin C. Symptoms and Functional Impairment Assessed 8 Months After Mild COVID-19 Among Health Care Workers. *JAMA*. 2021 Apr 7. doi:10.1001/jama.2021.5612 [↗](#)
5. Office of National Statistics. Prevalence of ongoing symptoms following coronavirus (COVID-19) infection in the UK: 1 April 2021. Accessed at: <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/prevalenceofongoingsymptomsfollowingcoronaviruscovid19infectionintheuk/1april2021> [↗](#)
6. Chevinsky JR, Tao G, Lavery AM, et al. Late conditions diagnosed 1-4 months following an initial COVID-19

- encounter: a matched cohort study using inpatient and outpatient administrative data - United States, March 1- June 30, 2020. *Clin Infect Dis*. 2021 Apr 28. doi: 10.1093/cid/ciab338 [↗](#)
7. Hernandez-Romieu AC, Leung S, Mbatya A, et al. Health Care Utilization and Clinical Characteristics of Nonhospitalized Adults in an Integrated Health Care System 28-180 Days After COVID-19 Diagnosis - Georgia, May 2020-March 2021. *MMWR Morb Mortal Wkly Rep*. 2021 Apr 30;70(17):644-650. doi: 10.15585/mmwr.mm7017e3 [↗](#)
 8. Lund LC, Hallas J, Nielsen H, Koch A, Mogensen SH, Brun NC, Christiansen CF, Thomsen RW, Pottegård A. Post-acute effects of SARS-CoV-2 infection in individuals not requiring hospital admission: a Danish population-based cohort study. *Lancet Infect Dis*. 2021 May 10. doi:10.1016/S1473-3099(21)00211-5 [↗](#)
 9. 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):220-232. doi:10.1016/S0140-6736(20)32656-8 [↗](#)
 10. Pavli A, Theodoridou M, Maltezou HC. Post-COVID syndrome: Incidence, clinical spectrum, and challenges for primary healthcare professionals. *Arch Med Res*. 2021 May 4. doi:10.1016/j.arcmed.2021.03.010 [↗](#)
 11. Cabrera Martimbianco AL, Pacheco RL, Bagattini ÂM, et al. Frequency, signs and symptoms, and criteria adopted for long COVID: a systematic review. *Int J Clin Pract*. 2021 May 11:e14357. doi:10.1111/ijcp.14357 [↗](#)
 12. Rando HM, Bennett TD, Byrd JB, et al. Challenges in defining Long COVID: Striking differences across literature, Electronic Health Records, and patient-reported information. *medRxiv*. 2021 Mar 26. doi:10.1101/2021.03.20.21253896 [↗](#)
 13. Office of National Statistics. Update on long COVID prevalence estimate. Accessed at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962830/s1079-ons-update-on-long-covid-prevalence-estimate.pdf [↗](#)
 14. Buonsenso D, Munblit D, De Rose C, et al. Preliminary evidence on long COVID in children. *Acta Paediatr*. 2021 Apr 9. doi:10.1111/apa.15870 [↗](#)
 15. Say D, Crawford N, McNab S, et al. Post-acute COVID-19 outcomes in children with mild and asymptomatic disease. *Lancet Child Adolesc Health*. 2021 Apr 20. doi:10.1016/S2352-4642(21)00124-3 [↗](#)
 16. Osmanov I, Spiridonova E, Bobkova P, et al. Risk factors for long covid in previously hospitalised children using the ISARIC Global follow-up protocol: A prospective cohort study. *medRxiv*. 2021 Apr 26. doi:10.1101/2021.04.26.21256110 [↗](#)
 17. Assaf G, Davis H, McCorkell L, et al. What does COVID-19 recovery actually look like? An analysis of the prolonged COVID-19 symptoms survey by Patient-Led Research Team. *Patient Led Research for COVID-19*, 2020. [↗](#)
 18. Lam MH, Wing YK, Yu MW, et al. Mental morbidities and chronic fatigue in severe acute respiratory syndrome survivors: long-term follow-up. *Arch Intern Med*. 2009 Dec 14;169(22):2142-7. doi:10.1001/archinternmed.2009.384 [↗](#)
 19. Lee SH, Shin HS, Park HY, et al. Depression as a Mediator of Chronic Fatigue and Post-Traumatic Stress Symptoms in Middle East Respiratory Syndrome Survivors. *Psychiatry Investig*. 2019 Jan;16(1):59-64. doi:10.30773/pi.2018.10.22.3. [↗](#)
 20. Lambert N, Survivor Corps, El-Azab SA, et al. COVID-19 Survivors' Reports of the Timing, Duration, and Health Impacts of Post-Acute Sequelae of SARS-CoV-2 (PASC) Infection. *medRxiv* 2021.03.22.21254026; doi:10.1101/2021.03.22.21254026 [↗](#)
 21. Colbenson GA, Johnson A, Wilson ME. Post-intensive care syndrome: impact, prevention, and management. *Breathe (Sheff)*. 2019 Jun;15(2):98-101. doi:10.1183/20734735.0013-2019 [↗](#)

22. Lavery AM, Preston LE, Ko JY, et al. Characteristics of Hospitalized COVID-19 Patients Discharged and Experiencing Same-Hospital Readmission - United States, March-August 2020. *MMWR Morb Mortal Wkly Rep*. 2020 Nov 13;69(45):1695-1699. doi: 10.15585/mmwr.mm6945e2
23. Chopra V, Flanders SA, O'Malley M, et al. Sixty-Day Outcomes Among Patients Hospitalized With COVID-19. *Ann Intern Med*. 2020 Nov 11. doi: 10.7326/M20-5661 [↗](#)
24. Ayoubkhani D, Khunti K, Nafilyan V, et al. Post-covid syndrome in individuals admitted to hospital with covid-19: retrospective cohort study. *BMJ*. 2021 Mar 31;372:n693. doi:10.1136/bmj.n693 [↗](#)
25. Atalla E, Kalligeros M, Giampaolo G, et al. Readmissions among patients with COVID-19. *Int J Clin Pract*. 2020 Sep 7:e13700. doi:10.1111/ijcp.13700 [↗](#)
26. Donnelly JP, Wang XQ, Iwashyna TJ, et al. Readmission and Death After Initial Hospital Discharge Among Patients With COVID-19 in a Large Multihospital System. *JAMA*. 2021 Jan 19;325(3):304-306. doi:10.1001/jama.2020.21465 [↗](#)
27. Somani SS, Richter F, Fuster V, et al. Characterization of Patients Who Return to Hospital Following Discharge from Hospitalization for COVID-19. *J Gen Intern Med*. 2020 Oct;35(10):2838-2844. doi:10.1007/s11606-020-06120-6 [↗](#)
28. Jeon WH, Seon JY, Park SY, et al. Analysis of Risk Factors on Readmission Cases of COVID-19 in the Republic of Korea: Using Nationwide Health Claims Data. *Int J Environ Res Public Health*. 2020 Aug 12;17(16). doi:10.3390/ijerph17165844 [↗](#)
29. Akinbami LJ, Petersen LR, Sami S, et al. COVID-19 symptoms and SARS-CoV-2 antibody positivity in a large survey of first responders and healthcare personnel, May-July 2020. *Clin Infect Dis*. 2021 Jan 30. doi:10.1093/cid/ciab080 [↗](#)
30. Petersen LR, Sami S, Vuong N, et al. Lack of antibodies to SARS-CoV-2 in a large cohort of previously infected persons. *Clin Infect Dis*. 2020 Nov 4.
31. American Academy of Pediatrics. COVID-19 Interim Guidance: Return to Sports and Physical Activity. Accessed at: <https://services.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/clinical-guidance/covid-19-interim-guidance-return-to-sports/> [↗](#)
32. 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 [↗](#)
33. COVID-19 Rapid Guideline: Managing the Long-Term Effects of COVID-19. Accessed at: <https://www.nice.org.uk/guidance/NG188> [↗](#)
34. 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 [↗](#)
35. Parkin A, Davison J, Tarrant R, et al. A Multidisciplinary NHS COVID-19 Service to Manage Post-COVID-19 Syndrome in the Community. *J Prim Care Community Health*. 2021 Jan-Dec;12:21501327211010994. doi:10.1177/21501327211010994 [↗](#)
36. Brigham E, O'Toole J, Kim SY, et al. The Johns Hopkins Post-Acute COVID-19 Team (PACT): A Multidisciplinary, Collaborative, Ambulatory Framework Supporting COVID-19 Survivors. *Am J Med*. 2021 Apr;134(4):462-467.e1. doi:10.1016/j.amjmed.2020.12.009 [↗](#)
37. Santhosh L, Block B, Kim SY, Raju S, Shah RJ, Thakur N, Brigham EP, Parker AM. How I Do It: Rapid Design and Implementation of Post-COVID-19 Clinics. *Chest*. 2021 Mar 31. doi:10.1016/j.chest.2021.03.044 [↗](#)
38. O'Brien H, Tracey MJ, Ottewill C, et al. An integrated multidisciplinary model of COVID-19 recovery care. *Ir J Med*

- Sci. 2021 May;190(2):461-468. doi:10.1007/s11845-020-02354-9 [↗](#)
39. Lopez-Leon S, Wegman-Ostrosky T, Perelman C, et al. More Than 50 Long-Term Effects of COVID-19: A Systematic Review and Meta-Analysis. *Res Sq*. 2021 Mar 1. doi:10.2139/ssrn.3769978 [↗](#)
 40. Al-Aly Z, Xie Y, Bowe B. High-dimensional characterization of post-acute sequelae of COVID-19. *Nature*. 2021 Apr 22. doi:10.1038/s41586-021-03553-9 [↗](#)
 41. Sudre CH, Murray B, Varsavsky T, et al. Attributes and predictors of long COVID. *Nat Med*. 2021 Apr;27(4):626-631. doi:10.1038/s41591-021-01292-y [↗](#)
 42. Lund LC, Hallas J, Nielsen H, et al. Post-acute effects of SARS-CoV-2 infection in individuals not requiring hospital admission: a Danish population-based cohort study. *Lancet Infect Dis*. 2021 May 10. doi:10.1016/S1473-3099(21)00211-5 [↗](#)
 43. Carfi A, Bernabei R, Landi F, et al. Persistent Symptoms in Patients After Acute COVID-19. *JAMA*. 2020 Aug 11;324(6):603-605. doi:10.1001/jama.2020.12603 [↗](#)
 44. Cellai M, O'Keefe JB. Characterization of Prolonged COVID-19 Symptoms in an Outpatient Telemedicine Clinic. *Open Forum Infect Dis*. 2020 Oct;7(10):ofaa420. doi:10.1093/ofid/ofaa420 [↗](#)
 45. Logue JK, Franko NM, McCulloch DJ, et al. Sequelae in Adults at 6 Months After COVID-19 Infection. *JAMA Netw Open*. 2021 Feb 1;4(2):e210830. doi:10.1001/jamanetworkopen.2021.0830 [↗](#)
 46. del Rio C, Collins LF, Malani P. Long-term health consequences of COVID-19. *JAMA*. 2020. doi:10.1001/jama.2020.19719 [↗](#)
 47. 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 May;8(5):416-427. doi:10.1016/S2215-0366(21)00084-5 [↗](#)
 48. Barker-Davies RM, O'Sullivan O, Senaratne KPP, et al. The Stanford Hall consensus statement for post-COVID-19 rehabilitation. *Br J Sports Med*. 2020 Aug;54(16):949-959. doi:10.1136/bjsports-2020-102596 [↗](#)
 49. Li Z, Zheng C, Duan C, et al. Rehabilitation needs of the first cohort of post-acute COVID-19 patients in Hubei, China. *Eur J Phys Rehabil Med*. 2020 Jun;56(3):339-344. doi: 10.23736/S1973-9087.20.06298-X. PMID: 32672029. doi:10.23736/s1973-9087.20.06298-x [↗](#)
 50. Daynes E, Gerlis C, Chaplin E, et al. Early experiences of rehabilitation for individuals post-COVID to improve fatigue, breathlessness exercise capacity and cognition - A cohort study. *Chron Respir Dis*. 2021 Jan-Dec;18:14799731211015691. doi:10.1177%2F14799731211015691 [↗](#)
 51. Berger Z, Altieri DE, Jesus V, Assoumou SA, et al. Long COVID and Health Inequities: The Role of Primary Care. *Milbank Q*. 2021 Mar 30. doi:10.1111/1468-0009.12505 [↗](#)
 52. Waltenburg MA, Victoroff T, Rose CE, et al. Update: COVID-19 Among Workers in Meat and Poultry Processing Facilities — United States, April–May 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:887-892. Accessed at: <https://www.cdc.gov/mmwr/volumes/69/wr/mm6927e2.htm>
 53. DT Arnold, A Milne, E Samms, et al. Are vaccines safe in patients with Long COVID? A prospective observational study. *medRxiv*. 2021 March 11; 21253225. Accessed at: <https://www.medrxiv.org/content/10.1101/2021.03.11.21253225v2> [↗](#)
 54. Santoli JM, Lindley MC, DeSilva MB, et al. Effects of the COVID-19 Pandemic on Routine Pediatric Vaccine Ordering and Administration - United States, 2020. *MMWR Morb Mortal Wkly Rep*. 2020 May 15;69(19):591-593.

Last Updated June 14, 2021

Content source: National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases