Monograph:

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Reviews on Long COVID

A scope of the literature: update

January 2023

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Reviews on Long COVID: A scope of the literature. Update January 2023

Raine G, Khouja C, Khatwa M, Harden M, Sutcliffe K, Sowden A

January 2023

Conflicts of interest
There were no conflicts of interest in the writing of this report.

Contributions
The opinions expressed in this publication are not necessarily those of the EPPI Centre or the funders. Responsibility for the views expressed remains solely with the authors.

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Summary

- For this update, we identified 50 published reviews and 56 new protocols for ongoing reviews on Long COVID. The number of published reviews is considerably larger than the total identified for our last quarterly report in October (n=29), which utilised the same databases and search strategy.
- Most published reviews were focused on the frequency or risk of persistent symptoms/effects, which has consistently been the case in all the reports we have produced to date.
- We identified more published reviews with a primary focus on Long COVID risk factors (10/50) than in October (1/29).
- A majority of the new protocols for ongoing reviews in the current update have a primary focus on Long COVID treatment/rehabilitation (n=33/56).

Introduction

This is the fourth update in an ongoing series of quarterly evidence scans for published systematic and ongoing reviews related to Long COVID requested by the Department of Health and Social Care. The last update covered the period July 2022 to October 2022.[1]

For the current update, we identified systematic reviews and review protocols focused on Long COVID that were published between early October 2022 and the start of January 2023. Long COVID was conceptualised broadly as any symptoms or effects that persist or develop after acute COVID-19 infection.

Identification of reviews

The Cochrane Database of Systematic Reviews (CDSR) and Epistemonikos were searched to identify reviews about Long COVID. In addition, MEDLINE and CINAHL were searched with retrieval limited to systematic reviews.[2,3] The searches took place on 4th January 2023 and were limited by date to capture records added to the databases since the last update searches in October 2022. No language restrictions were applied. A further search of PROSPERO was undertaken by the review team on 5th January 2023 to identify any new ongoing reviews. Due to the rapid nature of the project, the database searches were designed to balance the need to retrieve as many relevant systematic reviews as possible against the limited time available for screening. The search strategies for MEDLINE, CINAHL, CDSR and Epistemonikos can be found in Appendix 1 (page 24).

Study selection

To be included, reviews needed to have a primary focus on Long COVID (however conceptualised and defined) and be systematic in nature. A review was considered systematic if it reported some search terms and inclusion criteria and also reported the number of references retrieved and the number of studies included. Reviews could focus on adults and/or children and include primary

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[1] Raine G, Khouja C, Harden M, Sutcliffe K, Sowden A (2022) Reviews on Long COVID: A scope of the literature. Update October 2022. London: EPPI Centre, UCL Social Research Institute, UCL Institute of Education, University College London.

[2] Navarro-Ruan T, Haynes RB. Preliminary comparison of the performance of the National Library of Medicine's systematic review publication type and the sensitive clinical queries filter for systematic reviews in PubMed. J Med Libr Assoc. 2022;110:43-46.

[3] Booth A. Chapter 3: Searching for Studies. In: Noyes J, Booth A, Hannes K, Harden A, Harris J, Lewin S, Lockwood C (editors), Supplementary Guidance for Inclusion of Qualitative Research in Cochrane Systematic Reviews of Interventions. Version 1 (updated August 2011). Cochrane Collaboration Qualitative Methods Group, 2011.

studies of any design or other reviews (i.e. reviews of reviews). We did not apply criteria relating to the length of time after acute infection owing to variation in how Long COVID has been defined in the literature. Reviews were only included if the full text was readily available, and we excluded pre-prints. Titles and abstracts were screened by one reviewer; two reviewers screened the full text of papers.

Key findings

We screened 839 records and identified **50 published reviews and 56 new protocols for ongoing reviews**. The flow of studies through the review is shown in Appendix 2 (page 31). Table 1 provides a summary of all reviews identified for this update by focus. The full reference and aim/research questions for each included review are provided on pages 5-23. Table 2 (Appendix 3, page 32) provides a summary of the reviews identified across all four updates we have produced to date (January 2023, October 2022, July 2022, and April 2022).

Table 1: Summary of reviews (October 2022 to January 2023)

Review status Primary focus	Systematic review	Review of reviews	Evidence map
Published reviews (n=50)			
Treatment/rehabilitation[1]	5		
Prevention	2		
Symptoms/effects[2]	29	2	
Risk factors (RF); RF and prevalence	7	1	
RF, prevalence and treatment	1		
RF and prevention[3]	1		
Pathobiology and mechanisms	2		
Ongoing reviews (new protocols) (n=56)			
Treatment/rehabilitation	31	1	1
Prevention	1		
Symptoms/effects and treatment	1		
Symptoms/effects	13		
Risk factors (RF); RF and prevalence	4		
RF, prevalence and prevention	1		
Pathobiology and mechanisms	3		

[1] one paper included as a pre-print in our April report; [2] one paper included as a pre-print in our July report; [3] Paper included as a pre-print in our April report.

Published reviews

We identified a considerably larger number of published reviews for this update (n=50) compared with our last quarterly report in October (n=29), which utilised the same databases and search strategy. Reviews that focused on the frequency or risk of persistent symptoms/effects comprised the majority of the evidence we identified, which has consistently been the case in all the reports we have produced to date. More symptom/effects focused reviews were identified for the current update (n=31) than in October (n=19). The overall proportion of reviews with a primary focus on treatment/rehabilitation alone (5/50) was noticeably lower compared with our last report (5/29), but there was no change in the total number of these reviews.

Reviews of Long COVID symptoms/effects will sometimes report findings from sub-analyses that examine the relationship between prevalence/risk and factors such as gender, but it is generally not a primary focus of the work. In the current update, more reviews had a central focus on examining potential risk factors (10/50) compared with our October report (1/29).

Out of the 10 reviews that included a primary focus on risk factors, we identified one 'review of reviews' (#39 Rojas-Bolivar et al., 2022). Two standard systematic reviews compared Long COVID prevalence and risk according to SARS-CoV-2 variant (#41 Du et al. 2022; #42 Fernández-de-Las-Peñas et al., 2022). Another review focused specifically on the relationship between disease severity and Long COVID risk (#40 Dirican and Bal, 2022). Three reviews had a broader focus and reported evidence on Long COVID prevalence and risk in relation to multiple factors such as gender, age, disease severity, and co-morbidity (#43 Global Burden of Disease Long COVID Collaborators, 2022; #45 Huang et al., 2022; #46 Notarte et al., 2022). Two reviews examined Long COVID risk factors and interventions that could potentially treat or prevent the condition (#47 Zheng et al., 2022; #48 Pillay et al., 2022). The remaining study examined whether diabetes was a risk factor for Long COVID (#44 Harding et al., 2022).

The review by Harding et al. (2022) further examined whether COVID infection increased the risk of new onset diabetes (#44 Harding et al., 2022). We identified three other reviews that also focused on the risk of new onset diabetes following COVID-19 infection (#29 Ssentongo et al., 2022; #33 Wrona and Skrypnik, 2022; #35 Zhang et al., 2022). Two reviews focused on COVID vaccination for preventing Long COVID (#6 Goa et al., 2022; #7 Marra et al., 2022). We have now identified four published reviews on COVID vaccination and Long COVID in our two most recent reports (October, 2022 and January, 2023).

The reviews on symptoms/effects that we identified for the current update included two 'review of reviews' on the prevalence of depression during and after COVID-19 (#8 Mazza et al., 2023); and the prevalence of persistent musculoskeletal effects (#9 Swarnakar et al., 2022).

Protocol - ongoing reviews

The number of protocols for ongoing reviews identified (n=56) was slightly less than the total we reported in our October update (n=63). However, for the first time since we started producing our update reports, we found more protocols focused on treatment/rehabilitation (33/56) than symptoms/effects (18/56).[4]

Of the 33 protocols focused solely on treatment/rehabilitation, the majority investigated two broad groups of interventions (n=26). Thirteen ongoing reviews are examining acupuncture and/or other forms of Chinese, traditional, complementary or alternative medicine for Long COVID (#9 Dai et al., 2022; #13 Gawey et al., 2022; #15 Guo and Hu, 2022; #17 Liao et al., 2022; #18 Li and Yang, 2023; #19 Li and Haijing, 2022; #20 Liu et al., 2023; #22 Lu et al., 2022; #28 Xiao et al., 2022; #29 Xiao et al., 2022; #30 Zuo et al., 2022; #32 Zhang et al., 2022; #33 Zhang et al., 2022).

Thirteen other ongoing reviews, including an evidence map (#1 Sinha et al., 2022); and a review of reviews (#2 Chishtie et al., 2023), have a broad focus on rehabilitation therapies or care including physical therapy; inspiratory muscle training; or telerehabilitation (#4 Arienti et al., 2022; #6 Calvache Mateo et al., 2022; #7 Calvache Mateo et al., 2022; #8 Chacón Sevilla et al., 2022; #11 Estebanez-Perez et al., 2022; #12 Gastaldi et al., 2023; #21 Li and Zhou, 2022; #24 Martínez-Rolando et al., 2022; #25 Martínez et al., 2022; #27 Pouliopoulou et al., 2022; #31 Yang and Chen, 2023). Notably, the majority of ongoing reviews focused on treatment/rehabilitation (19/24) in our October report also had a focus on acupuncture and/or Chinese medicine/exercise (n=10) and physical therapy programmes (n=9).

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[4] Includes five ongoing reviews with a combined focus on symptoms/effect prevalence and risk factors. 13 are focused solely on symptoms/effects. One other ongoing review is focused on both symptoms/effects and treatment.

Another ongoing review in the current update has a specific focus on rehabilitation strategies for persistent cognitive problems (#26 Pariz et al., 2023). Out of the remaining six treatment/ rehabilitation related protocols, two are focused on treatments for persistent problems with individuals' sense of smell (olfactory dysfunction) (#3 AlRajhi et al., 2023; #14. Graf Provinciatto et al., 2022). The other four are focused on: the management of Long COVID in Primary Care settings worldwide (#5 Barreto Cardins et al., 2022); interventions to treat Opsoclonus-myoclonus-ataxia syndrome in post-COVID-19 patients (#10 Ellahi et al., 2022); Long COVID treatment using non-and minimal-invasive neuromodulation (#16 Koenig et al., 2022); and psychological interventions to treat individuals with COVID or Long COVID and comorbid emotional disorders (#23 Martinez-Borba et al., 2022).

1) Published Reviews
Treatment/rehabilitation (n=5)

1. Bernal-Utrera et al. Therapeutic exercise interventions through telerehabilitation in patients with post COVID-19 symptoms: A systematic review. J Clin Med. 2022;11(24):7521. https://doi.org/10.3390/jcm11247521

Aim: To analyse the current situation of telerehabilitation in patients with COVID-19 sequelae and its effectiveness.

2. Bilk et al. Aerobic exercise and dyspnea in healthy adults after SARSCoV2 infection: A systematic review. Brazilian Journal of Development. 2023;9(1):3428-3445. https://doi.org/10.34117/bjdv9n1-236

Aim: To investigate whether post-COVID 19 patients, without associated comorbidities, have developed dyspnea during aerobic exercise.

NB: This review only included one study (a single case report), which focused on the treatment that the patient received. It was published after the end date for our latest search (4th Jan, 2023), but was included in this update as a protocol for the review was registered on PROSPERO on 18th October 2022.

3. Chee et al. Clinical trials on the pharmacological treatment of Long COVID: A systematic review. J Med Virol. 2023;95(1):e28289. https://doi.org/10.1002/jmv.28289

Aim: To provide a comprehensive update on the completed and ongoing clinical trials on the management of Long COVID syndrome.

4. Décary et al. Scoping review of rehabilitation care models for post COVID-19 condition. Bull World Health Organ 2022;100:676-688. https://doi.org/10.2471/BLT.22.288105

Aim: To systematically map the evidence about health system, providers and patients' characteristics to guide decision-makers in designing sustainable rehabilitation care models for post COVID-19 condition.

NB: A pre-print of this paper was included in our April report.

5. Valverde-Martínez et al. Telerehabilitation, a viable option in patients with persistent post-COVID syndrome: A systematic review. Healthcare. 2023;11(2):187. https://doi.org/10.3390/healthcare11020187

Aim: To describe the effectiveness of telerehabilitation to alleviate the symptoms of post-COVID-19 syndrome.

NB: This review was published after the end date for our latest search (4th Jan, 2023), but was included in this update as a protocol for the review was registered on PROSPERO on 2nd November, 2022.

Prevention (n=2)

6. Gao et al. Effect of COVID-19 vaccines on reducing the risk of Long COVID in the real world: A systematic review and meta-analysis. Int J Environ Res Public Health. 2022;19(19):12422. https://doi.org/10.3390/ijerph191912422

Aim: To quantitatively explore the effect of COVID-19 vaccines on Long COVID, and to provide scientific evidence and suggestions.

7. Marra et al. The effectiveness of coronavirus disease 2019 (COVID-19) vaccine in the prevention of post-COVID-19 conditions: A systematic literature review and meta-analysis. Antimicrob Steward Healthc Epidemiol. 2022;2(1):e192. https://doi.org/10.1017/ash.2022.336

Aim: To review the literature on the effectiveness of COVID-19 vaccines for post–COVID-19 conditions

Symptoms and effects (n=31)

Review of reviews

8. Mazza et al. Prevalence of depression in SARS-CoV-2 infected patients: An umbrella review of meta-analyses. Gen Hosp Psychiatry. 2023;80:17-25. https://doi.org/10.1016/j.genhosppsych.2022.12.002

Aim: To synthesize the available meta-analytical evidence in an umbrella review exploring the prevalence of depression during and after SARS-CoV-2 infection.

9. Swarnakar et al. Musculoskeletal complications in Long COVID-19: A systematic review. World J Virol. 2022;11(6):485-495. https://doi.org/10.5501/wjv.v11.i6.485

Aim: To perform a systematic review of systematic reviews and meta-analyses to find musculoskeletal complications caused by Long COVID-19 conditions.

Standard systematic reviews

10. Alemu et al. Tuberculosis in individuals who recovered from COVID-19: A systematic review of case reports. PLoS One. 2022;17(11):e0277807. https://doi.org/10.1371/journal.pone.0277807

Aim: To assess Tuberculosis in individuals who recovered from COVID-19.

11. Campos et al. Long-term effect of COVID-19 on lung imaging and function, cardiorespiratory symptoms, fatigue, exercise capacity, and functional capacity in children and adolescents: A systematic review and meta-analysis. Healthcare. 2022;10(12):2492. https://doi.org/10.3390/healthcare10122492

Aim: To explore the persistent effects of COVID-19 beyond 3 months post-infection on children and adolescents' lung imaging and function, cardiorespiratory symptoms, fatigue, exercise capacity, and functional limitations.

12. Corona et al. Psychological and mental sequelae in elite athletes with previous SARS-CoV-2 infection: A systematic review. Int J Environ Res Public Health. 2022;19(24):16377. https://doi.org/10.3390/ijerph192416377

Aim: To summarise the current scientific evidence on the psychological sequelae and mental health of elite athletes who have been infected with the virus SARS-CoV-2.

13. Di Gennaro et al. Incidence of Long COVID-19 in people with previous SARS-CoV2 infection: A systematic review and meta-analysis of 120,970 patients. Intern Emerg Med. 2022 Nov 30:1–9. https://doi.org/10.1007/s11739-022-03164-w

Aim: To define the incidence of long-term COVID signs and symptoms as defined by the World Health Organization, using a systematic review and meta-analysis of observational studies.

14. Durstenfeld et al. Use of cardiopulmonary exercise testing to evaluate Long COVID-19 symptoms in adults: A systematic review and meta-analysis. JAMA Netw Open. 2022;5(10):e2236057. https://doi.org/10.1001/jamanetworkopen.2022.36057

Aim: To address whether adults with persistent COVID-19 symptoms more than 3 months after SARSCoV-2 infection have reduced exercise capacity on results of CPET compared with recovered individuals without symptoms and to identify potential causal pathways for the reduced exercise capacity after SARS-CoV-2 infection.

NB: A pre-print of this paper was included in our July report.

15. Franco et al. Short and long-term wellbeing of children following SARS-CoV-2 infection: A systematic review. Int J Environ Res Public Health. 2022;19(21):14392. https://doi.org/10.3390/ijerph192114392

Aim: To describe the findings of studies assessing key outcomes related to global wellbeing and recovery in children and adolescents from a public health perspective.

NB: This systematic review is based on an evidence map included in our October report.

16. Kokolevich et al. Most common Long COVID physical symptoms in working age adults who experienced mild COVID-19 infection: A scoping review. Healthcare. 2022;10(12):2577 https://doi.org/10.3390/healthcare10122577

Aim: To summarise the commonly reported physical symptoms of Long COVID in order to inform potential adjustments in healthcare for the employable population.

17. Laranjeira and Menezes. A systematic review of post-COVID electrocardiographic changes in young athletes. Cureus. 2022;14(11):e31829. https://doi.org/10.7759/cureus.31829

Aim: To evaluate the occurrence of electrocardiographic alterations in athletes during the post-COVID period.

18. Ma et al. Long-term consequences of asymptomatic SARS-CoV-2 infection: A systematic review and meta-analysis. Int J Environ Res Public Health. 2023;20(2):1613. https://doi.org/10.3390/ijerph20021613

Aim: To explore the long-term consequences of COVID-19 among those asymptomatic SARS-CoV-2 infection patients in the real world.

NB: This review was published after the end date for our latest search (4th Jan, 2023), but was included in this update as a protocol for the review was registered on PROSPERO on 14th October 2022.

19. Mansory et al. Venous and arterial thrombosis in ambulatory and discharged COVID-19 patients: A systematic review and meta-analysis. TH Open. 2022;6(3):e276-e282. https://doi.org/10.1055/a-1913-4377

Aim: To evaluate the epidemiology of venous and arterial thrombosis events in ambulatory and postdischarge patients with COVID-19 infection.

20. O'Mahoney et al. The prevalence and long-term health effects of Long COVID among hospitalised and non-hospitalised populations: A systematic review and meta-analysis. EClinicalMedicine. 2022;55:101762. https://doi.org/10.1016/j.eclinm.2022.101762

Aim: To systematically synthesise the global evidence on the prevalence of persistent symptoms in a general post COVID-19 population.

21. Patel et al. Neurological sequelae among severe COVID-19 patients: A systematic review and meta-analysis. Cureus. 2022;14(9):e29694. https://doi.org/10.7759/cureus.29694

Aim: To evaluate the long-term neurological effects of coronavirus disease 2019 (COVID-19) among patients discharged from the hospital.

22. Perrottelli et al. Cognitive impairment after post-acute COVID-19 infection: A systematic review of the literature. J Pers Med. 2022;12(12):2070. https://doi.org/10.3390/jpm12122070

Aim: To provide a critical overview of the literature on the relationships between post-acute COVID-19 infection and cognitive impairment, highlighting the limitations and confounding factors.

23. Rahmati et al. The effect of SARS-CoV-2 infection on cardiac function in post-COVID-19 survivors: A systematic review and meta-analysis. J Med Virol. 2023;95(1):e28325. https://doi.org/10.1002/jmv.28325

Aim: To elucidate the effect of SARS-CoV-2 infection on cardiac function in coronavirus disease 2019 (COVID-19) survivors after recovery.

24. Rochmawati et al. Persistent symptoms among post-COVID-19 survivors: A systematic review and meta-analysis. J Clin Nurs. 2022 Nov 25. https://doi.org/10.1111/jocn.16471

Aim: To determine the prevalence of symptoms up to one year in post-COVID-19 survivors.

25. Sachdev et al. Is there an association between COVID-19 and development of cognitive deficits? Clin Neuropsychiatry. 2022;19(5):328-334. https://doi.org/10.36131/cnfioritieditore20220508

Aim: To review COVID-19 related literature to determine whether there is an association between COVID-19 infection and the development of cognitive deficits.

26. Salari et al. Global prevalence of chronic fatigue syndrome among Long COVID-19 patients: A systematic review and meta-analysis. Biopsychosoc Med. 2022;16(1):21. https://doi.org/10.1186/s13030-022-00250-5

Aim: To obtain the prevalence of chronic fatigue syndrome in Long COVID cases.

27. Sampogna et al. The psychiatric consequences of Long-COVID: A scoping review. J Pers Med. 2022;12(11):1767. https://doi.org/10.3390/jpm12111767

Aim: to (1) describe the most frequent psychiatric symptoms presented by patients with the long-COVID syndrome; (2) evaluate methodological discrepancies among the available studies; (3) inform clinicians and policymakers on possible strategies in order to efficiently manage the psychiatric consequences of Long-COVID syndrome.

28. Shan et al. Post-COVID-19 human memory impairment: A PRISMA-based systematic review of evidence from brain imaging studies. Front Aging Neurosci. 2022;14:1077384. https://doi.org/10.3389/fnagi.2022.1077384

Aim: To present the most up-to-date information on memory dysfunction in COVID-19 survivors.

29. Ssentongo et al. Association of COVID-19 with diabetes: A systematic review and meta-analysis. Sci Rep. 2022;12(1):20191. https://doi.org/10.1038/s41598-022-24185-7

Aim: To estimate the incidence of newly diagnosed diabetes in survivors of COVID-19.

30. Surapaneni et al. A scoping review on Long COVID-19: physiological and psychological symptoms Post-Acute, Long-Post and persistent Post COVID-19. Healthcare. 2022;10(12):2418. https://doi.org/10.3390/healthcare10122418

Aim: To conduct a scoping search on the long-term consequences of COVID-19 on the physiological and the psychological health of COVID-19 long haulers.

31. Vásconez-González et al. A systematic review and quality evaluation of studies on long-term sequelae of COVID-19. Healthcare. 2022;10(12):2364. https://doi.org/10.3390/healthcare10122364

Aim: To present an overview of the information available on the sequelae of COVID-19.

32. Wang et al. Association between COVID-19 and male fertility: systematic review and meta-Analysis of observational studies. World J Mens Health. 2022 https://doi.org/10.5534/wjmh.220091

Aim: To evaluate the effects and recovery time from COVID-19 on sperm quality and sex hormones, and how the disease affects male fertility.

33. Wrona and Skrypnik. New-onset diabetes mellitus, hypertension, dyslipidaemia as sequelae of COVID-19 infection-systematic review. Int J Environ Res Public Health. 2022;19(20):13280. https://doi.org/10.3390/ijerph192013280

Aim: To present the latest scientific reports that evaluate changes in glucose levels, blood pressure readings and lipid profiles after recovery from COVID-19 to verify the hypothesis that new-onset diabetes mellitus, arterial hypertension and dyslipidaemia are a possible sequela of a COVID-19 infection.

34. Yasuhara et al. Longitudinal cardiac outcomes of multisystem inflammatory syndrome in children: A systematic review and meta-analysis. Pediatr Cardiol. 2022 Nov 22:1–16. https://doi.org/10.1007/s00246-022-03052-2

Aim: To clarify mid-term cardiovascular outcomes in patients with multisystem inflammatory syndrome (MIS-C) in children.

35. Zhang et al. Risk for newly diagnosed diabetes after COVID-19: A systematic review and meta-analysis. BMC Med. 2022 Nov 15;20(1):444. https://doi.org/10.1186/s12916-022-02656-y

Aim: To estimate the prevalence of a new diagnosis of diabetes after COVID-19 compared to non-COVID-19.

36. Zuin et al. One-Year Risk of myocarditis after COVID-19 infection: A systematic review and meta-analysis. Can J Cardiol. 2022 Dec 12:S0828-282X(22)01092-3. https://doi.org/10.1016/j.cjca.2022.12.003

Aim: To assess the risk of incident myocarditis in COVID-19 survivors within one year from the index infection by a systematic review and meta-analysis.

37. Zuin et al. Increased risk of acute myocardial infarction after COVID-19 recovery: A systematic review and meta-analysis. Int J Cardiol. 2023;372:138-143. https://doi.org/10.1016/j.ijcard.2022.12.032

Aim: To assess the incidence and risk of acute myocardial infarction in COVID-19 survivors after SARS-CoV-2 infection by a systematic review and meta-analysis.

38. Zuin et al. Risk of incident heart failure after COVID-19 recovery: A systematic review and meta-analysis. Heart Fail Rev. 2022 Dec 27:1–6. https://doi.org/10.1007/s10741-022-10292-0

Aim: To assess the risk of incident heart failure in COVID-19 recovered patients by performing a systematic review and meta-analysis.

Risk factors; risk factors and prevalence (n=8)

Review of Reviews

39. Rojas-Bolivar et al. Prevalence, clinical manifestations, and associated factors of Long COVID-19. Revista de la Facultad de Medicina Humana. 2022;22(3):572-583. https://doi.org/10.25176/RFMH.v22i3.5009

Aim: To synthesise the available scientific information from systematic reviews regarding the prevalence, clinical manifestations, and associated factors of Long COVID-19.

Standard systematic reviews

40. Dirican and Bal. COVID-19 disease severity to predict persistent symptoms: A systematic review and meta-analysis. Prim Health Care Res Dev. 2022;23:e69. https://doi.org/10.1017/S1463423622000585

Aim: To examine whether the initial disease severity affects the risk of persistent symptoms in post-acute COVID-19 syndrome and Long COVID.

41. Du et al. Comparison of Long COVID-19 Caused by Different SARS-CoV-2 Strains: A Systematic Review and Meta-Analysis. Int J Environ Res Public Health. 2022;19(23):16010. https://doi.org/10.3390/ijerph192316010

Aim: To systematically assess Long COVID-19 that was caused by different SARS-CoV-2 strains at 3 months and above.

42. Fernández-de-Las-Peñas et al. Long-COVID symptoms in individuals infected with different SARS-CoV-2 variants of concern: A systematic review of the literature. Viruses. 2022;14(12):2629. https://doi.org/10.3390/v14122629

Aim: To answer the following research questions: (1) what is the prevalence of long-COVID symptoms in people infected with different SARS-CoV-2 variants, and (2) is there any difference in terms of Long-COVID symptoms among these variants?

43. Global Burden of Disease Long COVID Collaborators et al. Estimated global proportions of individuals with persistent fatigue, cognitive, and respiratory symptom clusters following symptomatic COVID-19 in 2020 and 2021. JAMA. 2022;328(16):1604-1615. https://doi.org/10.1001/jama.2022.18931

Aim: To estimate the proportion of males and females with COVID-19, younger or older than 20 years of age, who had Long COVID symptoms in 2020 and 2021 and assess their symptom severity and expected Long COVID symptom duration.

44. Harding et al. The bidirectional association between diabetes and Long-COVID-19 - A systematic review. Diabetes Res Clin Pract. 2022;195:110202. https://doi.org/10.1016/j.diabres.2022.110202

Aim: to examine whether diabetes is: 1) a risk factor for PASC; and 2) a manifestation of PASC.

45. Huang et al. One-year temporal changes in Long COVID prevalence and characteristics: A systematic review and meta-analysis. Value Health. 2022:S1098-3015(22)04743-X. https://doi.org/10.1016/j.jval.2022.11.011

Aim: To explore the one-year temporal change in prevalence, variety, and potential risk factors of Long COVID symptoms and to further predict the prognostic trends of Long COVID.

46. Notarte et al. Age, sex and previous comorbidities as risk factors not associated with SARS-CoV-2 infection for Long COVID-19: A systematic review and meta-analysis. J Clin Med. 2022;11(24):7314. https://doi.org/10.3390/jcm11247314

Aim: To identify risk factors not associated with Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection, but rather potentially predictive of the development of Long COVID-19.

Risk factors, prevalence and treatment (n=1)

47. Zheng et al. Prevalence, risk factors and treatments for post-COVID-19 breathlessness: A systematic review and meta-analysis. Eur Respir Rev. 2022;31(166):220071. https://doi.org/10.1183/16000617.0071-2022

Aim: To conduct a systematic review and meta-analysis to comprehensively evaluate the prevalence of post-COVID breathlessness across different populations and also to synthesise data from studies that examined risk factors, mechanisms and potential interventions for post-COVID breathlessness.

Risk factors and prevention (n=1)

48. Pillay J et al. Risk factors and preventive interventions for post C-19 condition: systematic review. Emerg Microbes Infect. 2022;11(1):2762-2780. https://doi.org/10.1080/22221751.2022.2140612.

Aim: To examine pre-existing and clinical risk factors for post COVID-19 condition (≥12 weeks after onset), and interventions during acute and post-acute phases of illness that could potentially prevent post COVID-19 condition.

NB: A pre-print of this paper was included in April report.

Pathobiology and mechanisms (n=2)

49. Ambrosino et al. Clinical assessment of endothelial function in convalescent COVID-19 patients: A meta-analysis with meta-regressions. Ann Med. 2022;54(1):3234-3249. https://doi.org/10.1080/07853890.2022.2136403

Aim: To perform a systematic review with meta-analysis of all studies evaluating flow mediated dilation (FMD) and nitrate-mediated dilation (NMD) in convalescent COVID-19 patients and controls with no history of COVID-19.

50. Haunhorst et al. A scoping review of regulatory T cell dynamics in convalescent COVID-19 patients - indications for their potential involvement in the development of Long COVID? Front Immunol. 2022;13:1070994. https://doi.org/10.3389/fimmu.2022.1070994

Aim: To summarise the existing literature regarding the frequency and functionality of T-regulatory cells in convalescent COVID-19 patients and to explore indications for their potential involvement in the development of Long COVID.

Protocols of ongoing reviews related to Long COVID

Treatment/rehabilitation (n=33)

Evidence map

1. Sinha et al. Global mapping of exercise interventions among COVID-19 survivors: protocol for a scoping review. BMJ Open. 2022 Nov 4;12(11):e059987. http://doi.org/10.1136/bmjopen-2021-059987

Review aim(s): To systematically map and collate the published literature on the exercise interventions among COVID-19 survivors.

NB: Protocol published in an academic journal.

Review of reviews

2. Chishtie et al. Long COVID and rehabilitation: An umbrella review. PROSPERO 2023 CRD42023384757 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023384757

Review question(s): What rehabilitation services are being provided to Long COVID patients, and their efficacy, in coordination with other care services?

Standard systematic review

3. AlRajhi et al. Platelet-rich plasma for the treatment of COVID-19 related olfactory dysfunction: A systematic review and meta-analysis. PROSPERO 2023 CRD42023386803 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023386803

Review question(s): Does platelet-rich plasma treat COVID-19 related olfactory dysfunction?

NB: Review will include patients who developed olfactory dysfunction during as well as after COVID infection.

4. Arienti et al. Effectiveness of rehabilitation interventions for adults with COVID-19 or post COVID-19 condition: A systematic review with meta-analysis. PROSPERO 2022 CRD42022374244 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022374244

Review question(s): To assess the effectiveness of rehabilitation interventions alone or as an added component to any other interventions, compared to any other intervention (including, but not limited to, usual care (UC) and placebo) or no interventions, in adults with COVID-19 or post COVID-19 condition.

5. Barreto Cardins et al. Care of people with post-COVID-19 sequelae in the scope of primary health care: scoping review protocol. Int J Environ Res Public Health. 2022 Oct 27;19(21):13987. https://doi.org/10.3390/ijerph192113987

Review aim: To identify and map the care process of monitoring and multi-professional follow-up of post-COVID-19 sequelae within the scope of primary health care worldwide.

NB: Protocol published in an academic journal.

6. Calvache Mateo et al. Telerehabilitation interventions for patients with Long COVID: A systematic review. PROSPERO 2022 CRD42022373781 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022373781

Review aim(s): To investigate telerehabilitation interventions for patients affected with post-COVID-19 syndrome.

7. Calvache Mateo et al. Rehabilitation interventions for patients with Long COVID: A systematic review. PROSPERO 2022 CRD42022371820 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022371820

Review aim(s):To investigate rehabilitation interventions for patients affected with post-COVID-19 syndrome.

8. Chacón Sevilla et al. Influence of therapeutic exercise on post-COVID-19 syndrome. PROSPERO 2022 CRD42022383287 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022383287

Review question(s): What is the influence of therapeutic exercise on cardiopulmonary health, physical fitness, and quality of life in subjects with post-COVID-19 syndrome?

9. Dai et al. The efficacy and safety of traditional Chinese medicine for treating convalescent patients with COVID-19: A systematic review and meta-analysis. PROSPERO 2022 CRD42022374554 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022374554

Review question(s): To confirm the efficacy and safety of TCM for treating COVID-19 sequelae.

10. Ellahi et al. Opsoclonus-myoclonus-ataxia syndrome following the Coronavirus disease: A systematic review. PROSPERO 2022 CRD42022365663 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022365663

Review question(s): How to diagnose the patients who were previously infected with COVID-19, and presenting with symptoms of opsoclonus, myoclonus, and ataxia? What will be the intervention plan for these patients?

11. Estebanez-Perez et al. Effectiveness of digital physiotherapy practice in Long COVID-19 patients. A systematic review. PROSPERO 2022 CRD42022379004 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022379004

Review question(s): The practice of digital physiotherapy could be considered an effective intervention rehabilitation for Long COVID-19 patients?

12. Gastaldi et al. Effects of cardiopulmonary rehabilitation on exercise capacity and quality of life in post-COVID-19 patients: A systematic review. PROSPERO 2023 CRD42023389365 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023389365

Review question(s): For which post-COVID-19 patients is cardiopulmonary rehabilitation most beneficial?

13. Gawey et al. Treatment of gastrointestinal manifestations of acute and Long COVID with complementary and alternative medicine. PROSPERO 2022 CRD42022372333 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022372333

Review question(s): In patients with gastrointestinal manifestations of acute COVID and Long COVID (symptoms present 4 weeks after initial infection), are complementary and alternative medicine approaches effective in providing symptomatic relief?

14. Graf Provinciatto et al. Mometasone furoate nasal spray on recovery of long-term olfactory dysfunction due to COVID-19: A systematic review and meta-analysis. PROSPERO 2022 CRD42022382930 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022382930

Review question(s): Is mometasone furoate nasal spray effective on recovery of patients with long-term olfactory dysfunction due to COVID-19?

15. Guo and Hu. Traditional Chinese medicine for post-COVID-19 dyspepsia: A protocol for systematic review and meta-analysis. PROSPERO 2022 CRD42022362931 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022362931

Review question(s): To observe the effect of traditional Chinese medicine (TCM) on dyspepsia after COVID-19.

16. Koenig et al. Neuromodulation for post- and Long-COVID conditions: A systematic review and meta-analysis. PROSPERO 2022 CRD42022378409 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022378409

Review question(s): To address the current evidence concerning the use and effectiveness of non- and minimal-invasive neuromodulation techniques for post and Long COVID. Which treatment protocols (i.e., stimulation settings, targets, duration and frequency) are applied? How effective are these on different symptom domains?

17. Liao et al. Clinical efficacy of traditional Chinese medicine in the treatment of COVID-19 in the convalescent stage: A systematic review and meta-analysis. PROSPERO 2022 CRD42022375358 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022375358

Review question(s): To evaluate the efficacy and safety of traditional Chinese medicine (TCM) in the treatment of COVID-19 in the convalescent stage.

18. Li and Yang. Effects of acupuncture on rehabilitation of patients with Long COVID: A protocol for systematic review and meta-analysis. PROSPERO 2023 CRD42023389183 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023389183

Review aim(s): To evaluate the effectiveness and safety of acupuncture in the rehabilitation of patients with Long COVID.

19. Li and Haijing. Effectiveness and safety of acupuncture for post-COVID-19 depression: A protocol for systematic review and meta-analysis. PROSPERO 2022 CRD42022379312 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022379312

Review question(s): Is acupuncture effective in treating post-COVID-19 depression?

20. Liu et al. Effectiveness of Traditional Chinese Medicine massage on gastrointestinal sequelae and sleep difficulties in patients recovered from COVID-19: A protocol for systematic review and meta-analysis. PROSPERO 2023 CRD42023383927 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023383927

Review question(s): What is the effectiveness and safety of massage in improving gastrointestinal sequelae and sleep quality in patients recovering from COVID-19?

21. Li and Zhou. Intervention effects of physical exercise on post-coronaviral sequelae: A systematic review and meta-analysis. PROSPERO 2022 CRD42022370176 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022370176

Review aim(s): To provide scientific prescriptions for physical activity in today's population with sequelae caused by the global spread of the new coronavirus.

22. Lu et al. Effectiveness and safety of Traditional, Complementary and Integrative Medicine on fatigue post COVID-19 infection: A systematic review of randomized controlled trials. PROSPERO 2022 CRD42022384136 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022384136

Review question(s): What kinds of Traditional, Complementary and Integrative Medicine (TCIM) are effective and safe in the treatment of fatigue post COVID-19 infection?

23. Martinez-Borba et al. Psychological interventions for patients suffering COVID-19 and post COVID-19 syndrome with comorbidity of emotional disorders or symptoms: A systematic review. PROSPERO 2022 CRD42022367227 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022367227

Review aim(s): To explore the main characteristics of the psychological interventions delivered to patients with COVID-19 or Long COVID-19 conditions and comorbid emotional disorders or symptoms.

24. Martínez-Rolando et al. Searching for the most appropriate telerehabilitation protocol for post-COVID-19 patients: A systematic review and meta-analysis. PROSPERO 2022 CRD42022381971 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022381971

Review question(s): To evaluate which is the best telerehabilitation protocol to improve functionality in patients with Long COVID-19?

25. Martínez et al. Efficacy of Pulmonary Rehabilitation after COVID-19 infection: A Network Meta-Analysis. PROSPERO 2022 CRD42022373075 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022373075

Review question(s): To assess the efficacy of pulmonary rehabilitation in patients with post-acute COVID-19 and Long-COVID?

26. Pariz et al. Rehabilitation strategies for post-acute COVID-19 patients with neuropsychological impairments: A systematic review. PROSPERO 2023 CRD42023389452 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023389452

Review question(s): What cognitive rehabilitation strategies have been utilized and what is their effect on cognitive functioning in post-acute COVID-19 patients with cognitive difficulties?

27. Pouliopoulou et al. Efficacy and safety of rehabilitation interventions in patients with post-COVID syndrome: A systematic review with meta-analysis. PROSPERO 2022 CRD42022359266 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022359266

Review question(s): Are rehabilitation interventions effective at improving aerobic and respiratory function and quality of life, in patients diagnosed with Long-COVID?

28. Xiao et al. Acupuncture for sleep disorder after recovery from COVID-19: A systematic review and meta-analysis protocol. PROSPERO 2022 CRD42022373163 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022373163

Review aim(s): To investigate acupuncture for sleep disorder after recovery from COVID-19.

29. Xiao et al. Acupuncture for swallowing disorder after recovery from COVID-19: A systematic review and meta-analysis protocol. PROSPERO 2022 CRD42022371868 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022371868

Review aim(s): To investigate acupuncture for swallowing disorder after recovery from COVID-19.

30. Zou et al. Traditional Chinese medicine for post-viral olfactory dysfunction: A systematic review. PROSPERO 2022 CRD42022366776 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022366776

Review question(s): What's the effectiveness of Traditional Chinese Medicine for Post-viral olfactory dysfunction?

31. Yang and Chen. Inspiratory muscle training enhances recovery post COVID-19: A systematic review and meta-analysis. PROSPERO 2023 CRD42023388608 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023388608

Review question(s): The aim of the current study was to investigate the potential rehabilitative role of inspiratory muscle training.

32. Zhang et al. A protocol for systematic review and meta-analysis of the efficacy and safety of acupuncture in the treatment of depression caused by COVID-19. PROSPERO 2022 CRD42022374476 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022374476

Review question(s): What is the efficacy and safety of acupuncture in the treatment of post-COVID-19 depression?

33. Zhang et al. Traditional Chinese medicine acupuncture and manipulation therapies for Long COVID Fatigue: A systematic review and meta-analysis protocol. PROSPERO 2022 CRD42022376999 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022376999

Review question(s): How do Traditional Chinese Medicine Acupuncture and Manipulation therapies impact Long COVID fatigue?

Prevention (n=1)

34. Ma et al. The efficiency of vaccination in protecting COVID-19 patients from Long COVID: A systematic review and meta-analysis. PROSPERO 2022 CRD42022382527 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022382527

Review aim(s): to find out the efficiency of vaccination in protecting COVID-19 patients from Long COVID and which type and dosage will be the effective strategy to reduce the incidence of Long COVID.

Symptoms/effects and treatment (n=1)

35. Acharya et al. A systematic review and quantitative analysis of clinical profile and management of Long COVID. PROSPERO 2022 CRD42022358920 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022358920

Review question(s): What is the prevalence of long-term effects associated with COVID-19? What are the available strategies for management of Long COVID?

Symptoms/effects (n=13)

36. Aryelle Ferreira et al. Cardiac autonomic control in post-COVID-19 patients: A systematic review. PROSPERO 2022 CRD42022380451 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022380451

Review question(s): Does COVID-19 alter cardiac autonomic control? What tools are being used to assess cardiac autonomic control in post-COVID-19 patients?

37. Babu Shrestha et al. Long COVID heart outcomes: A systematic review and meta-analysis. PROSPERO 2022 CRD42022366930 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022366930

Review question(s): Does post COVID syndrome compared with healthy people have any cardiovascular association? Is it associated with mortality, ischemic heart disease inflammatory disease, total embolic events, stroke, heart rate variability, cardiac arrest, and shock?

38. Gaudet et al. Associations between COVID-19 and incidence or exacerbations of chronic conditions. PROSPERO 2022 CRD42022364883 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022364883

Review question(s): What are the associations between SARS-CoV-2 infection and the incidence of new diagnoses or exacerbations of chronic conditions in groups based on age and severity of infection?

39. Hu et al. Long-term consequences of SARS-CoV-2 Omicron variant: A systematic review and meta-analysis. PROSPERO 2022 CRD42022382052 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022382052

Review question(s): What are the long-term consequences of SARS-CoV-2 Omicron variant?

40. Lin et al. A systematic review and meta-analysis of COVID-related dysphonia and persistent Long-COVID voice sequelae. PROSPERO 2022 CRD42022383399 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022383399

Review question(s): What is the prevalence of dysphonia in COVID-19 patients during the infection period, and after a long-term follow-up following the recovery?

41. Markus et al. Systematic literature review investigating how Long COVID is defined and measured in real world practice. PROSPERO 2022 CRD42022376111 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022376111

Review question(s): What definitions of Long COVID are being used in real-world practice and studies? What regional and/or age-group differences exist when defining Long COVID? How have real-world studies been conducted on Long COVID? What outcomes have been used? How have data been collected? What length of follow-up has been used? How have validation of data collection tools and diagnosis of Long COVID estimations been conducted? Are there differences in study design (e.g. duration and methods of follow up) and population characteristics (e.g. duration and severity of COVID-19 infection) between studies reporting Long COVID outcomes in adult and pediatric populations?

42. Middleton et al. Functional recovery of adults hospitalised with COVID-19: A systematic review and meta-analysis. PROSPERO 2022 CRD42022367436 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022367436

Review question(s): What is the functional recovery of patients with COVID-19 more than 12 weeks after acute infection?

43. Mudgal et al. Prevalence of COVID-19 long-term effects at 12 months and above follow-up: A systematic review and meta-analysis. PROSPERO 2022 CRD42022371537 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022371537

Review question(s): Are COVID-19 diagnosed patients still having symptoms at 12 months and above follow-up?

44. Nanovic et al. Respiratory symptoms, pulmonary function and lung CT findings in patients with post-COVID-19 syndrome: A systematic review and meta-analysis. PROSPERO 2022 CRD42022368236 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022368236

Review question(s): What is the proportion of patients with the post-COVID-19 syndrome who experience respiratory symptoms (dyspnea, cough, increased sputum production, and/or hemoptysis)? What is the proportion of patients with the post-COVID-19 syndrome who have lung CT abnormalities (fibrosis, ground-glass opacities, etc.)? What is the proportion of patients with post-COVID-19 syndrome who have pulmonary function tests (PFTs) (spirometry, diffusing capacity of the lungs for carbon monoxide (DLCO), etc.) and 6-minute walk test (6-MWT) abnormalities? What are the mean values and standard deviations of PFTs parameters in patients with post-COVID19 syndrome?

45. Salmam et al. Physical and cardiorespiratory deficits in people suffering from Long COVID. PROSPERO 2022 CRD42022352812 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022352812

Review question(s): What are the physical and cardiorespiratory deficits in people suffering from Long COVID?

46. Silva-Passadouro et al. Systematic review of EEG findings in Long COVID and similar chronic conditions (fibromyalgia, ME/CFS, post-viral syndromes). PROSPERO 2022 CRD42022382079 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022382079

Review question(s): Are there EEG correlates of Long COVID? Are there EEG correlates of fibromyalgia, myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) and post-viral syndromes? Are there similarities between EEG findings in Long COVID and EEG findings in fibromyalgia, ME/CFS, post-viral syndromes?

47. Sousa Jansen et al. Quality of life assessment instruments in post COVID19 patients: systematic review. PROSPERO 2022 CRD42022382742 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022382742

Review question(s): What are the instruments (questionnaires) used to assess the quality of life in post-COVID19 patients?

48. Zou et al. Changes in bone mineral density after COVID-19: A systematic review and meta-analysis. PROSPERO 2023 CRD42023388970 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023388970

Review question(s): In this review, we will evaluate bone mineral density changes after COVID-19 infection in persons with or without pre-pandemic osteoporosis.

Risk factors; risk factors and prevalence (n=4)

49. Holland et al. The relationship between elevated immune response and cognitive difficulties in Long COVID: A systematic review. PROSPERO 2022 CRD42022366920 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022366920

Review question(s): Is there a relationship between elevated immune response and cognition Long COVID?

50. Liu et al. Acute and postacute sequelae associated with SARS-CoV-2 reinfection: A systematic review and meta-analysis. PROSPERO 2022 CRD42022382226 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022382226

Review question(s): Dose the SARS-CoV-2 reinfection increase the risk of acute and postacute sequelae?

51. Soriano de Sousa et al. Long-term neuropsychiatric effects of COVID ("Long COVID") on the pediatric and adolescent population: Assessing the putative association with therapeutical and non-therapeutical use of opioids. PROSPERO 2022 CRD42022365153 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022365153

Review question(s): What are the long-term neuropsychiatric symptoms, signs, and putative sequels of COVID-19 infection among children and adolescents? Is there an association between the use of potent opioids (e.g. fentanyl) in the management of severe COVID and the subsequent development of side effects secondary to prolonged opioid use and opioid use disorder (OUD)?

52. Tsampasian and Vassiliou. Risk factors for Long COVID: A systematic review and meta-analysis. PROSPERO 2022 CRD42022381002 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022381002

Review question(s): Are there specific risk factors associated with the development of Long COVID syndrome?

Risk factors; Risk factors, prevalence and prevention (n=1)

53. Pupillo et al. Systematic review of neuromuscular manifestations post COVID-19 disease and post SARS-CoV-2 vaccination. PROSPERO 2022 CRD42022381669 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022381669

Review question(s): In patients affected by COVID-19 disease and surviving the acute phase, what is the prevalence of persistent neuromuscular manifestations (at 3 or 6 or 12 or 18 or 24 months of follow-up)? In patients affected by COVID-19 disease and surviving the acute phase, what is the incidence of new neuromuscular manifestations (at 3 or 6 or 12 or 18 or 24 months of follow-up)? In patients affected by severe COVID-19 disease and surviving the acute phase, what is the risk of experiencing persistent neuromuscular manifestations or developing new neuromuscular manifestations compared to those with mild-moderate COVID-19 disease? In patients hospitalized because of COVID-19 disease and surviving the acute phase, what is the risk of experiencing persistent neuromuscular manifestations or developing new neuromuscular manifestations compared to those who were not hospitalized? In patients vaccinated against SARS-CoV-2, what is the incidence of new neuromuscular manifestations? (at 4-6 weeks of follow-up) In patients vaccinated against SARS-Cov-2, what are the types of new neuromuscular manifestations ascertained during the follow-up? In patients vaccinated against SARS-Cov-2, what is the risk of developing new neuromuscular manifestations by type of vaccine? In patients vaccinated against SARS-Cov-2, what is the risk of developing new neuromuscular manifestations in persons who had COVID-19 infection vs. those who had not?

Pathobiology and mechanisms (n=3)

54. Aslan et al. Etiology and pathophysiology (mechanisms) of fatigue and dyspnea in Post-Acute COVID-19 Syndrome (PACS) infected Individuals. PROSPERO 2022 CRD42022377433 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022377433

Review question(s): Investigating the mechanism(s) or the etiology of fatigue and dyspnea in post-acute COVID-19-inflicted individuals.

55. Thomas et al. Long COVID status and blood biomarkers: A systematic review. PROSPERO 2022 CRD42022373121 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022373121

Review question(s): What are the blood biomarkers that determine Long COVID status?

56. Yong et al. Inflammatory and vascular biomarkers in post-COVID-19 syndrome: A systematic review and meta-analysis. PROSPERO 2022 CRD42022371337 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022371337

Review aim(s): To summarize the existing evidence on potential biomarkers for PCS, which may also help unearth the accurate pathophysiologic driver and appropriate treatments of PCS.

Appendix 1: Search strategies

MEDLINE ALL

(includes: Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE Daily and Ovid MEDLINE)

via Ovid http://ovidsp.ovid.com/

Date range: 1946 to December 30, 2022

Date searched: 4th January 2023

Records retrieved: 406

MEDLINE was searched again on 5th January 2023 as Ovid alerted users to a problem with a missing batch of records that had not be added to MEDLINE during the period 21st December 2022 – 4th January 2023. This gave an extra 163 records in total. Therefore, the total number of records retrieved from MEDLINE for this search was 569.

1   post-acute COVID-19 syndrome.mp. (1368)
2   COVID-19 post-intensive care syndrome.mp. (5)
3   COVID-19/ or SARS-CoV-2/ (200739)
4   Syndrome/ (121448)
5   Survivors/ (29375)
6   4 or 5 (150711)
7   3 and 6 (801)
8   1 or 2 or 7 (2099)
9   ((long adj (covid$ or covid-19 or covid19 or coronavirus)) or longcovid$).ti,ab,kf,ot,bt. (2127)
10   ((post adj (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) or postcovid$).ti,ab,kf,ot,bt. (5821)
11   ((post acute or postacute) adj2 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (534)
12   PASC.ti,ab,kf,ot,bt. (466)
13   (sequela$ adj6 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (1681)
14   (chronic adj2 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (249)
15   ((long$ term or longterm) adj3 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (1557)
16   (persist$ adj6 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (2831)
17   ((post discharg$ or postdischarg$) adj5 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (101)
18   ((long haul$ or longhaul$) adj6 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (208)
19   (surviv$ adj3 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (2327)
20   (after adj (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (6308)
21   ((ongoing or lasting or prolonged or fluctuat$ or residual$ or continu$ or linger$) adj6 (symptom$ or effect$ or complication$ or sequela$ or syndrome or illness$ or disorder$ or dysfunction$ or impair$ or impact$ or consequence$) adj6 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (1998)
22   or/9-21 (20149)
23   8 or 22 (20534)
24   systematic review.mp,pt. (281736)

25 search:.tw. (605862)
26 meta analysis.mp,pt. (261682)
27 review.pt. (3091052)
28 24 or 25 or 26 or 27 (3584199)
29 23 and 28 (3231)
30 qualitative review$.ti,ab,kf,ot,bt. (1660)
31 realist synthes$.ti,ab,kf,ot,bt. (353)
32 realist review$.ti,ab,kf,ot,bt. (589)
33 (meta-synthes$ or metasynthes$).ti,ab,kf,ot,bt. (1863)
34 (living adj2 (review$ or map$)).ti,ab,kf,ot,bt. (636)
35 pooled analysis.ti,ab,kf,ot,bt. (11851)
36 or/30-35 (16784)
37 23 and 36 (50)
38 29 or 37 (3234)
39 (202209$ or 202210$ or 202211$ or 202212$).dt. (381586)
40 38 and 39 (407)
41 exp animals/ not humans.sh. (5086122)
42 40 not 41 (406)

CINAHL Plus
via Ebsco https://www.ebsco.com/
Date range: Inception to 20230103
Date searched: 4th January 2023
Records retrieved: 124

S1	(MH "Post-Acute COVID-19 Syndrome")	561
S2	TI (long N1 (covid* or covid-19 or covid19 or coronavirus) or longcovid*) OR AB (long N1 (covid* or covid-19 or covid19 or coronavirus) or longcovid*)	914
S3	TI (post N1 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2) or postcovid*) OR AB (post N1 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2) or postcovid*)	1,240
S4	TI (("post acute" or post-acute or postacute) N3 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) OR AB (("post acute" or post-acute or postacute) N3 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2))	252
S5	TI PASC OR AB PASC	84
S6	TI (sequela* N6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) OR AB (sequela* N6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2))	457
S7	TI (chronic N2 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) OR AB (chronic N2 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2))	223
S8	TI ((long* N1 term or long-term or longterm) N3 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) OR AB (	857

(long* N1 term or long-term or longterm) N3 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2))

S9	TI (persist* N6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) OR AB (persist* N6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2))	745
S10	TI ((post N1 discharg* or post-discharg* or postdischarg*) N4 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) OR AB ((post N1 discharg* or post-discharg* or postdischarg*) N4 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2))	44
S11	TI ((long N1 haul* or long-haul* or longhaul*) N6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) OR AB ((long N1 haul* or long-haul* or longhaul*) N6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2))	85
S12	TI (surviv* N3 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) OR AB (surviv* N3 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2))	911
S13	TI (after N1 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) OR AB (after N1 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2))	3,295
S14	TI ((ongoing or lasting or prolonged or fluctuat* or residual* or continu* or linger*) N6 (symptom* or effect* or complication* or sequela* or syndrome or illness* or dysfunction* or disorder* or impair* or impact* or consequence*) N6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) OR AB ((ongoing or lasting or prolonged or fluctuat* or residual* or continu* or linger*) N6 (symptom* or effect* or complication* or sequela* or syndrome or illness* or dysfunction* or impair* or impact* or consequence*) N6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2))	741
S15	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14	8,039
S16	(MH "Systematic Review")	117,124
S17	(ZT "systematic review")	137,697
S18	(ZT "meta analysis")	50,758
S19	(MH "Meta Analysis")	67,619
S20	TI (meta-analys* or metaanaly*) OR AB (meta-analys* or metaanaly*)	101,362
S21	TI systematic* N1 review* OR AB systematic* N1 review*	143,004
S22	S16 OR S17 OR S18 OR S19 OR S20 OR S21	241,500
S23	(ZT "review")	355,338
S24	AB systematic* or AB methodologic* or AB quantitative* or AB research* or AB literature* or AB studies or AB trial* or AB effective*	2,863,468

S25	(S23 AND S24)	166,267
S26	S22 OR S25	399,155
S27	S15 AND S26	472
S28	(MH "Meta Synthesis")	2,027
S29	TI qualitative N1 review* OR AB qualitative N1 review*	3,607
S30	TI (realist N1 (review* or synthes*)) OR AB (realist N1 (review* or synthes*))	510
S31	TI (meta-synthes* or metasynthes*) OR AB (meta-synthes* or metasynthes*)	1,659
S32	TI (living N2 (review* or map*)) AND (living N2 (review* or map*))	190
S33	TI pooled N1 analys* OR AB pooled N1 analys*	7,906
S34	S28 OR S29 OR S30 OR S31 OR S32 OR S33	14,500
S35	S15 AND S34	24
S36	S27 OR S35	482
S37	EM 202209-	117,147
S38	(ZD "in process")	743,752
S39	S37 OR S38	860,899
S40	S36 AND S39	124

Cochrane Database of Systematic Reviews (CDSR)
via Wiley http://onlinelibrary.wiley.com/
Issue: Issue 1 of 12, January 2023
Date searched: 4th January 2023
Records retrieved: 3

| #1 | MeSH descriptor: [COVID-19] this term only | 2592 |

| #2 | MeSH descriptor: [SARS-CoV-2] this term only | 1191 |

| #3 | MeSH descriptor: [Syndrome] this term only | 5672 |

| #4 | MeSH descriptor: [Survivors] this term only | 1293 |

#5   #1 or #2   2599

#6   #3 or #4   6964

#7   #5 and #6   28

#8   (long next (covid* or covid-19 or covid19 or coronavirus) or longcovid*):ti,ab,kw 169

#9   (post next (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2) or postcovid*):ti,ab,kw   402

#10   ((post acute or postacute) near/2 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)):ti,ab,kw   754

#11   PASC:ti,ab,kw   32

#12   (sequela* near/6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)):ti,ab,kw   93

#13   (chronic near/2 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)):ti,ab,kw   26

#14   ((long* term or longterm) near/3 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)):ti,ab,kw   496

#15   (persist* near/6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)):ti,ab,kw   157

#16   ((post discharg* or postdischarg*) near/5 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)):ti,ab,kw 753

#17   ((long haul* or longhaul*) near/6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)):ti,ab,kw   310

#18   (surviv* near/3 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)):ti,ab,kw   149

#19   (after next (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)):ti,ab,kw   191

#20   ((ongoing or lasting or prolonged or fluctuat* or residual* or continu* or linger*) near/6 (symptom* or effect* or complication* or sequela* or syndrome or illness* or dysfunction* or disorder* or impair* or impact* or consequence*) near/6 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)):ti,ab,kw   104

#21   {OR #8-#20}   1783

#22   #7 or #21 with Cochrane Library publication date Between Oct 2022 and Dec 2022, in Cochrane Reviews, Cochrane Protocols   3

Epistemonikos
https://www.epistemonikos.org/
Date searched: 4th January 2023
Records retrieved: 459

1. (title:((title:("long covid" OR long-covid OR longcovid OR "long covid 19" OR long-covid-19 OR longcovid19 OR "long covid19" OR long-covid19 OR "longcovid 19" OR longcovid-19 OR "long coronavirus" OR long-coronavirus OR longcoronavirus) OR abstract:("long covid" OR long-covid OR longcovid OR "long covid 19" OR long-covid-19 OR longcovid19 OR "long covid19" OR long-covid19 OR "longcovid 19" OR longcovid-19 OR "long coronavirus" OR long-coronavirus OR longcoronavirus)) OR (title:("post covid" OR post-covid OR postcovid OR "post covid 19" OR post-covid-19 OR postcovid19 OR "post covid19" OR post-covid19 OR "postcovid 19" OR postcovid-19 OR "post coronavirus" OR post-coronavirus OR postcoronavirus OR "post SARS CoV 2" OR post-SARS-CoV-2 OR postSARSCoV2 OR "post SARS CoV2" OR "post-SARS CoV2" OR "postSARS CoV2" OR "post SARS-CoV2" OR post-SARS-CoV2 OR postSARS-CoV2 OR "post SARSCoV 2" OR "post-SARSCoV 2" OR "postSARSCov 2" OR "post SARSCoV-2" OR "post-SARSCoV-2" OR "postSARSCoV-2" OR PASC) OR abstract:("post covid" OR post-covid OR postcovid OR "post covid 19" OR post-covid-19 OR postcovid19 OR "post covid19" OR post-covid19 OR "postcovid 19" OR postcovid-19 OR "post

coronavirus" OR post-coronavirus OR postcoronavirus OR "post SARS CoV 2" OR post-SARS-CoV-2 OR postSARSCoV2 OR "post SARS CoV2" OR "post-SARS CoV2" OR "postSARS CoV2" OR "post SARS-CoV2" OR post-SARS-CoV2 OR postSARS-CoV2 OR "post SARSCoV 2" OR "post-SARSCoV 2" OR "postSARSCov 2" OR "post SARSCoV-2" OR "post-SARSCoV-2" OR "postSARSCoV-2" OR PASC))) OR abstract:((title:("long covid" OR long-covid OR longcovid OR "long covid 19" OR long-covid-19 OR longcovid19 OR "long covid19" OR long-covid19 OR "longcovid 19" OR longcovid-19 OR "long coronavirus" OR long-coronavirus OR longcoronavirus) OR abstract:("long covid" OR long-covid OR longcovid OR "long covid 19" OR long-covid-19 OR longcovid19 OR "long covid19" OR long-covid19 OR "longcovid 19" OR longcovid-19 OR "long coronavirus" OR long-coronavirus OR longcoronavirus)) OR (title:("post covid" OR post-covid OR postcovid OR "post covid 19" OR post-covid-19 OR postcovid19 OR "post covid19" OR post-covid19 OR "postcovid 19" OR postcovid-19 OR "post coronavirus" OR post-coronavirus OR postcoronavirus OR "post SARS CoV 2" OR post-SARS-CoV-2 OR postSARSCoV2 OR "post SARS CoV2" OR "post-SARS CoV2" OR "postSARS CoV2" OR "post SARS-CoV2" OR post-SARS-CoV2 OR postSARS-CoV2 OR "post SARSCoV 2" OR "post-SARSCoV 2" OR "postSARSCov 2" OR "post SARSCoV-2" OR "post-SARSCoV-2" OR "postSARSCoV-2" OR PASC) OR abstract:("post covid" OR post-covid OR postcovid OR "post covid 19" OR post-covid-19 OR postcovid19 OR "post covid19" OR post-covid19 OR "postcovid 19" OR postcovid-19 OR "post coronavirus" OR post-coronavirus OR postcoronavirus OR "post SARS CoV 2" OR post-SARS-CoV-2 OR postSARSCoV2 OR "post SARS CoV2" OR "post-SARS CoV2" OR "postSARS CoV2" OR "post SARS-CoV2" OR post-SARS-CoV2 OR postSARS-CoV2 OR "post SARSCoV 2" OR "post-SARSCoV 2" OR "postSARSCov 2" OR "post SARSCoV-2" OR "post-SARSCoV-2" OR "postSARSCoV-2" OR PASC))))
Limits = added to database from 03/10/2022 onwards, broad synthesis = 8, SR = 63

2. (title:("post acute" OR post-acute OR postacute) OR abstract:("post acute" OR post-acute OR postacute)) AND (title:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2) OR abstract:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2))
Limits = added to database from 03/10/2022 onwards, broad synthesis = 1, SR = 18

3. (title:("long haul" OR "long hauler" OR "long haulers" OR long-haul* OR longhaul*) OR abstract:("long haul" OR "long hauler" OR "long haulers" OR long-haul* OR longhaul*)) AND (title:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2) OR abstract:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2))
Limits = added to database from 03/10/2022 onwards, broad synthesis = 0, SR = 1

4. (title:(sequela*) OR abstract:(sequela*)) AND (title:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2) OR abstract:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2))
Limits = added to database from 03/10/2022 onwards, broad synthesis = 1, SR = 31

5. (title:("chronic covid" OR "chronic covid-19" OR "chronic covid19" OR "chronic coronavirus" OR "chronic SARS CoV 2" OR "chronic SARS-CoV-2" OR "chronic SARSCoV2" OR "chronic SARS CoV2" OR "chronic SARS-CoV2" OR "chronic SARSCoV 2" OR "chronic SARSCoV-2") OR abstract:("chronic covid" OR "chronic covid-19" OR "chronic covid19" OR "chronic coronavirus" OR "chronic SARS CoV 2" OR "chronic SARS-CoV-2" OR "chronic SARSCoV2" OR "chronic SARS CoV2" OR "chronic SARS-CoV2" OR "chronic SARSCoV 2" OR "chronic SARSCoV-2"))
Limits = added to database from 03/10/2022 onwards, broad synthesis = 0, SR = 1

6. (title:("long term" OR "longer term" OR long-term OR longer-term) OR abstract:("long term" OR "longer term" OR long-term OR longer-term)) AND (title:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2) OR abstract:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2))
Limits = added to database from 03/10/2022 onwards, broad synthesis = 16, SR = 87

7. (title:(persist*) OR abstract:(persist*)) AND (title:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2) OR abstract:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2))
Limits = added to database from 03/10/2022 onwards, broad synthesis = 5, SR = 45

8. (title:("post discharge" OR post-discharge OR postdischarge) OR abstract:("post discharge" OR post-discharge OR postdischarge)) AND (title:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2) OR abstract:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2))
Limits = added to database from 03/10/2022 onwards, broad synthesis = 0, SR = 6

9. (title:(survivor* OR survived) OR abstract:(survivor* OR survived)) AND (title:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2) OR abstract:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2))
Limits = added to database from 03/10/2022 onwards, broad synthesis = 2, SR = 25

10. (title:(ongoing OR lasting OR prolonged OR fluctuat* OR residual* OR continu* OR linger*) OR abstract:(ongoing OR lasting OR prolonged OR fluctuat* OR residual* OR continu* OR linger*)) AND (title:(symptom* OR effect* OR complication* OR sequela* OR syndrome OR illness* OR disorder* OR dysfunction* OR impair* OR impact* OR consequence* OR manifest*) OR abstract:(symptom* OR effect* OR complication* OR sequela* OR syndrome OR illness* OR disorder* OR dysfunction* OR impair* OR impact* OR consequence* OR manifest*)) AND (title:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2) OR abstract:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2))
Limits = added to database from 03/10/2022 onwards, broad synthesis = 18, SR = 131
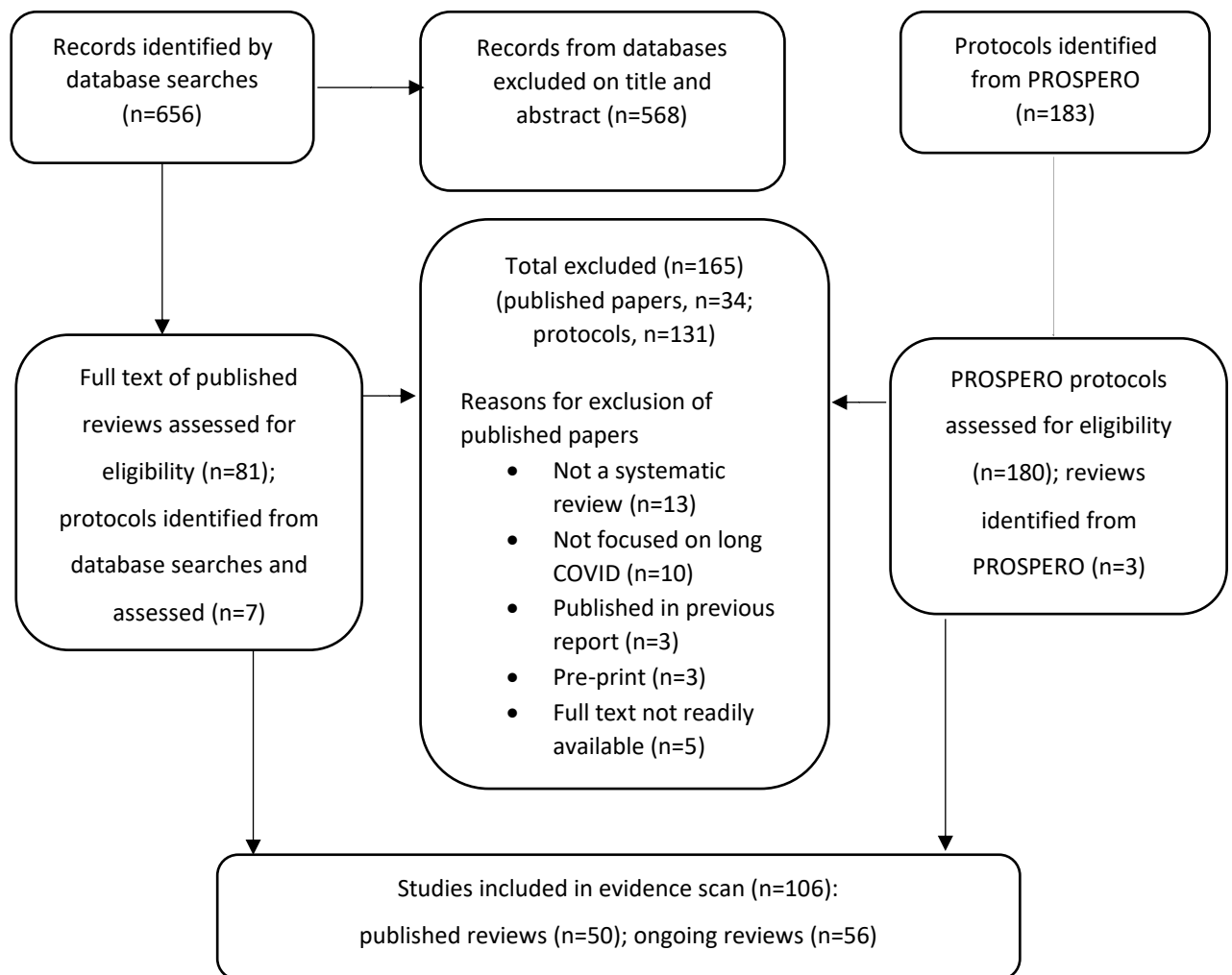
Appendix 2: Flow of studies through the review

```
┌─────────────────────────┐      ┌─────────────────────────┐      ┌─────────────────────────┐
│  Records identified by  │ ───► │  Records from databases │      │  Protocols identified   │
│    database searches    │      │   excluded on title and │      │     from PROSPERO       │
│        (n=656)          │      │    abstract (n=568)     │      │        (n=183)          │
└───────────┬─────────────┘      └─────────────────────────┘      └───────────┬─────────────┘
            │                                                                  │
            ▼                                                                  │
┌─────────────────────────┐      ┌─────────────────────────┐                  │
│  Full text of published │      │  Total excluded (n=165) │      ┌───────────▼─────────────┐
│   reviews assessed for  │      │  (published papers,     │      │   PROSPERO protocols    │
│   eligibility (n=81);   │ ───► │   n=34; protocols,      │ ◄─── │  assessed for eligibility│
│  protocols identified   │      │   n=131)                │      │   (n=180); reviews      │
│  from database searches │      │  Reasons for exclusion  │      │   identified from       │
│     and assessed (n=7)  │      │  of published papers    │      │   PROSPERO (n=3)        │
│                         │      │   • Not a systematic    │      │                         │
│                         │      │     review (n=13)       │      │                         │
│                         │      │   • Not focused on long │      │                         │
│                         │      │     COVID (n=10)        │      │                         │
│                         │      │   • Published in prev.  │      │                         │
│                         │      │     report (n=3)        │      │                         │
│                         │      │   • Pre-print (n=3)     │      │                         │
│                         │      │   • Full text not       │      │                         │
│                         │      │     readily available   │      │                         │
│                         │      │     (n=5)               │      │                         │
└───────────┬─────────────┘      └─────────────────────────┘      └───────────┬─────────────┘
            │                                                                  │
            ▼                                                                  ▼
┌──────────────────────────────────────────────────────────────────────────────────────────┐
│              Studies included in evidence scan (n=106):                                    │
│              published reviews (n=50); ongoing reviews (n=56)                              │
└──────────────────────────────────────────────────────────────────────────────────────────┘
```

Table 2: Summary of reviews (January 2023 to April 2022)

Report date	January 2023	October 2022	July 2022	April 2022
Review status **Primary focus**	Oct '22 to Jan '23	Jul '22 to Oct '22	Apr '22 to June'22	Nov '21 to Mar '22
Published reviews	**50**	**29**	**28**	**54**
Treatment/rehabilitation	5	5	3	11
Treatment/prevention		2		
Prevention	2	1		
Health and Social		1		
Symptoms/effects	31	19	22	38
Risk factors (RF); RF and prevalence	8		3	
RF, prevalence and treatment	1	1		
RF and prevention	1			
Pathobiology and mechanisms	2			
Risk factor/pathobiology				5
Completed not published		**2**		**5**
Treatment/rehabilitation				1
Symptoms/effects		2		4
Ongoing reviews (new protocols)	**56**	**63**	**59**	**73**
Treatment/rehabilitation	33	24	12	17
Treatment/prevention		4		
Prevention	1		2	4
Symptoms/effects and treatment	1			
Health and Social		1	1	
Symptoms/effects	13	30	31	47
Risk factors (RF); RF and prevalence	4		10	
RF, prevalence and prevention	1			
Pathobiology and mechanisms	3		3	
Risk factor/pathobiology		4		5

NB: Caution is required in drawing direct comparisons across time. Records for the January 2023 and October 2022 updates were identified using a more comprehensive search strategy and a different combination of databases compared with the April and July 2022 reports. Pre-prints and early online versions of reviews were also included in the April and July reports.

This document is available in a range of accessible formats including large print.
Please contact the Social Science Research Unit for assistance.

Email: ioe.ssruadmin@ucl.ac.uk
Telephone: +44 (0)20 7331 5263