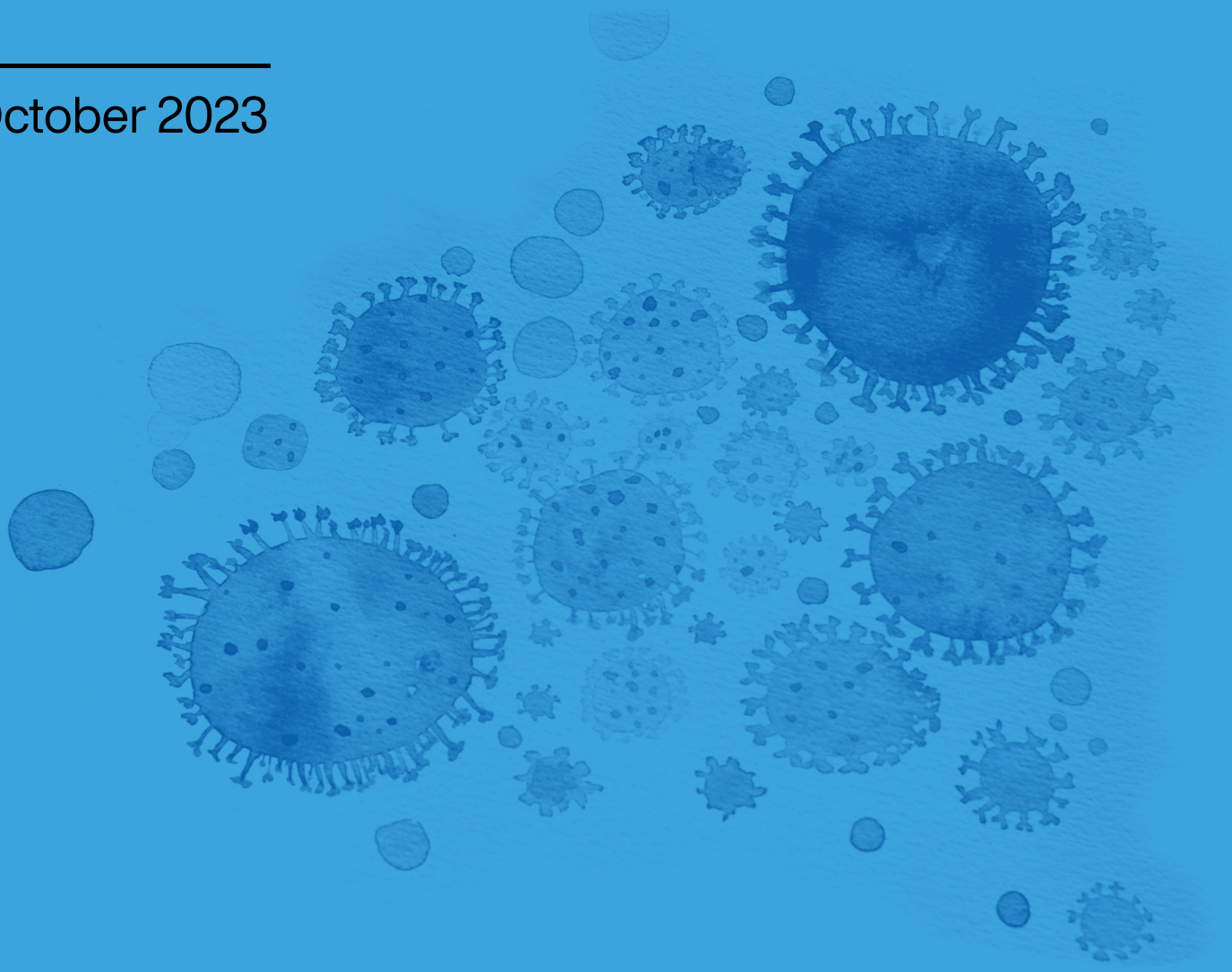
NIHR Policy Research Programme Reviews Facility

Supporting national policy development and implementation

Reviews on Long COVID

A scope of the literature: update

October 2023



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

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Summary

- For this update, we identified 46 published reviews and 44 review protocols for Long COVID. The number of published reviews has increased since our last two quarterly reports in April (n=37) and July (n=31).
- Most published reviews were focused on the prevalence of symptoms or effects (20/46), which is consistent with the earlier reports.
- We identified fewer published reviews with a primary focus on Long COVID risk factors (1/46) than in July (6/31), and more on treatment or rehabilitation (n=11 vs n=5 in July).
- We identified more reviews on pathobiology or mechanisms (n=6) compared with July (n=1).
- Most of the protocols were focused on the prevalence of symptoms or effects (24/44), unlike in the three previous reports, where more protocols were focused on treatment or rehabilitation.
- Most of the other protocols were focused on treatment (8/44), or risk factors with or without prevalence (7/44).

Introduction

This is the seventh update (eighth report) 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 from April 2023 to July 2023.[1]

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

Methods

Identification of reviews

The Cochrane Database of Systematic Reviews (CDSR; via Wiley) and Epistemonikos were searched to identify reviews about Long COVID. In addition, MEDLINE (via Ovid) and CINAHL (via EBSCO) were searched with retrieval limited to systematic reviews.[2,3] The searches took place on 3rd October 2023 and were limited by date to capture those records added to the databases since the last update searches in July 2023. No language restrictions were applied. A further search of PROSPERO was undertaken, by the review team, up to the 3rd October 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 22).

[1] Khouja C, Raine G, Khatwa M, Harden M, Sutcliffe K, Sowden A (2023) Reviews on Long COVID: A scope of the literature. Update July 2023. 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.

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, as well as the number of references found and studies included, and identified or referenced the included studies. Reviews could focus on adults and/or children and include primary studies of any design or other reviews (i.e., reviews of reviews). We did not apply criteria relating to the length of time after 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 each paper that was not excluded on title and abstract.

Key findings

From the database searches, 913 records were retrieved in total, and after duplicates were removed in EndNote (version 20), 558 records remained for screening. From PROSPERO, we screened 177 records. We identified **46 published reviews, three protocols for completed but not published reviews, and 41 protocols for ongoing reviews**. The flow of studies through the review is shown in Appendix 2 (page 29). 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 8 to 21. Table 2 (Appendix 3, page 30) provides a summary of the reviews identified across all eight reports we have produced to date (October 2023, July 2023, April 2023, January 2023, October 2022, July 2022, April 2022, and November 2021).

Table 1: Summary of reviews (July to October 2023)

Review status Primary focus	Systematic review	Review of reviews	Evidence map
Published reviews (n=46)			
Treatment or rehabilitation	11		
Treatment or rehabilitation, and prevention	1		
Treatment or rehabilitation, and pathobiology or mechanisms	1		
Treatment or rehabilitation, prevention, and prevalence	1		
Prevalence of symptoms or effects	18	2	
Prevalence of symptoms or effects, treatment, and economics	1		
Risk factors +/- prevalence of symptoms or effects	1		
Pathobiology or mechanisms	6		
Risk factors +/- prevalence, and pathobiology or mechanisms	2		
Health and economics	1		
Public and patient involvement	1		
Protocols - completed not published reviews (n=3)			
Prevalence of symptoms or effects	2		
Risk factors +/- prevalence of symptoms or effects	1		
Protocols - ongoing reviews (n=41)			
Treatment or rehabilitation	8		
Treatment or rehabilitation and prevention	1		
Prevention	2		
Prevalence of symptoms or effects	22		
Prevalence of symptoms or effects, and pathobiology or mechanisms	1		
Risk factors +/- prevalence of symptoms or effects	5	1	
Health and economics	1		

Published reviews

The number of systematic reviews identified for this update (n=46) was more than in July (n=31) and April (n=37) 2023, and October 2022 (n=29), but less than in January 2023 (n=50). All using the same databases and search strategy.

Treatment or rehabilitation (n=11)

The number of reviews in the current update that focused solely on treatment or rehabilitation (n=11) was more than in the previous four reports (all n=5). Eight of the 11 reviews focused on rehabilitation – three on physical therapy/physiotherapy (#3 Estebanez-Perez, et al., 2023, #8 Sanchez-Garcia, et al., 2023, and #9 Scott, et al., 2023); two on pulmonary/respiratory rehabilitation (#1 Calvache-Mateo, et al., 2023, and #6 Melendez-Oliva, et al., 2023); two on rehabilitation interventions (#7 Pouliopoulou, et al., 2023, and #10 Torres and Gradidge, 2023); and one on rehabilitation guidelines (#5 Marshall-Andon, et al., 2023). The other three reviews focused on treatments – palmitoethanolamide and luteolin (PEA-LUT) for olfactory dysfunction (#2 Capra, et al., 2023); complementary and alternative medicine for gastrointestinal symptoms (#4 Gawey, et al., 2023); and experimental drugs (#11 Yong, et al., 2023).

Prevention (n=0)

No reviews, in this update, focused solely on prevention.

Treatment or rehabilitation, and prevention (n=1)

One review focused on both treatment and prevention of Long COVID, using vaccination (#12 Jennings, et al., 2023). Across all reviews to date, there are now eight published reviews that focus on vaccination to prevent Long COVID.

Treatment or rehabilitation, and pathobiology or mechanisms (n=1); and treatment or rehabilitation, prevention, and prevalence of symptoms or effects (n=1)

Two publications included two reviews. One publication focused on amyloid fibrin(ogen) particles, including a review on their role in the pathobiology of Long COVID, and a review on plasmapheresis as a treatment to remove them (#13 Fox, et al., 2023). The other publication included a review of reviews on the prevalence of Long COVID treatable traits, and a review of primary studies on treatment and prevention (#14 Lewthwaite, et al., 2023).

Prevalence of symptoms or effects (n=20)

Just under half of the reviews focused on the prevalence of symptoms or effects of Long COVID (20/46). Two of these were reviews of reviews (#15 Li, et al., 2023; and #16 Vandersteen, et al., 2023). The review of reviews by Vandersteen and colleagues focused on Alzheimer's disease detection in people with Long COVID; the review by Li and colleagues investigated any Long COVID symptoms.

Five reviews of primary studies investigated any Long COVID symptoms. One was a review of any symptoms after COVID-19 infection (#31 Sreelakshmi, et al., 2023). Two reviews investigated any symptoms in patients who had been hospitalised with COVID-19 (#22 Kelly, et al., 2023, and #27 Nazir, et al., 2023). One review investigated any symptoms, in children (#17 AbdelMassih, et al., 2023). One review was on any symptoms in asthma patients (#21 Kaszuba, et al., 2023).

Two reviews investigated a range of symptoms or a syndrome. One was on the relative risks of developing three Long COVID symptoms (fatigue, shortness of breath or dyspnoea, and cognitive dysfunction), as well as quality of life, compared with uninfected controls (#26 Marjenberg, et al., 2023). The other was on multisystem inflammatory syndrome related to COVID-19, in children (#20 Jiang, et al., 2023).

Eleven reviews investigated specific types of symptoms or effects, after COVID-19 infection. Three focused on the prevalence of diabetes (#18**Error! Reference source not found.** Bellia, et al., 2023); pericarditis (#33 Zuin, et al., 2023); or stroke (#34 Zuin, et al., 2023). One focused on cholangiopathy, defined as inflammation and damage to the bile ducts (#29 Rasheed, et al., 2023). One review focused on gastrointestinal symptoms alone (#19 Hawkings, et al., 2023); one on gastrointestinal and neurological symptoms (#30 Sherif, et al., 2023); one on cognitive symptoms alone (#28 Nicotra, et al., 2023); and one on olfactory and neurocognitive symptoms (#32 Vilarello, et al., 2023). The remaining three reviews focused on pain (#23 Kerzhner, et al., 2023), sleep problems (#24 Linh, et al., 2023), and psychiatric symptoms (#25 Marchi, et al., 2023).

Prevalence of symptoms or effects, treatment or rehabilitation, and economics (n=1)

One qualitative systematic review focused on cognitive symptom prevalence, as well as treatment and impact on health system economics worldwide (#36 Espinoza and Martella, 2023).

Risk factors with or without prevalence of symptoms or effects (n=1)

One review, in this update, focused on risk factors for Long COVID, with or without symptom prevalence (#37 Alilou, et al., 2023), specifically on lung sequelae. There were six reviews on risk factors in the July, three in the April, and 10 in the January 2023 reports.

Risk factors with or without prevalence of symptoms or effects, and pathobiology or mechanisms (n=2)

Two reviews reported on risk factors with or without prevalence, and pathobiology or mechanisms. One was on neuroanatomic abnormalities in COVID patients, with a section on Long COVID (#35 Kiyak, et al., 2023), and the other was on mechanisms and prevalence in African populations (#38 Nyasulu, et al., 2023).

Pathobiology or mechanisms (n=6)

Six reviews focused solely on the pathobiology or mechanisms of Long COVID (#39 Akbari, et al., 2023, #40 Guinto, et al., 2023, #41 Seyedmirzaei, et al., 2023, #44 Shafiee, et al., 2023, #42 Udeh, et al., 2023, and #43 Vasilev, et al., 2023); more than in the previous three reports (July 2023, n=1; April 2023, n=3; and January 2023, n=2). Two of the six included patients with COVID-19 in general, with a section on patients with Long COVID (#39 Akbari, et al., 2023 and #44 Shafiee, et al., 2023).

Health and economics (n=1); and Public and patient involvement (n=1)

One review addressed the effects of Long COVID on health care systems (#45 Katz, et al., 2023) and another was on public and patient involvement in Long COVID research (#46 Dalko, et al., 2023).

Protocols – completed not published reviews (n=3)

In this update, we identified three protocols for completed but not yet published reviews. Two were on prevalence of symptoms or effects (#47 Abd Razak, et al., 2023 and #48 Tang, et al., 2023), and one was on cardiovascular diseases as risk factors for Long COVID (#49 Sha'ari, et al., 2023).

Protocols - ongoing reviews (n=41)

We identified 41 protocols for ongoing reviews, which is less than in each of the last four reports (July 2023, n=52; April 2023, n=68; January 2023, n=56; and October 2022, n=63). Most of the review protocols for this update were on prevalence of symptoms or effects (n=23), or treatment or rehabilitation (n=8).

Treatment or rehabilitation (n=8)

Eight protocols for ongoing reviews were on treatment or rehabilitation. Two were on physiotherapy or rehabilitation (#51 Correia, et al., 2023; #56 Romanet, et al., 2023). One was on guidelines for the

management of Long COVID (#50 Ata, et al., 2023). The other five were on: Pilates (#57 Santos Gomes Jorge and Wibelinger, 2023); cognitive interventions (#52 Hutchins, et al., 2023); complementary treatments for olfactory dysfunction (#53 Mota, et al., 2023); psychotherapy to reduce suicidal ideation in adolescents after COVID infection (#55 Rodriguez Garcia, et al., 2023); and immunomodulator therapy for children with Long COVID (#54 Nugroho Supranoto, et al., 2023).

Treatment and prevention (n=1)

One protocol focused on both treatment and prevention by vaccination (#58 Markus, et al., 2023).

Prevention (n=2)

Two protocols focused solely on prevention. Both were on vaccination or booster doses to prevent Long COVID (#59 Gutfreund, et al., 2023; and #60 Patel and Korsun, 2023).

Prevalence of symptoms or effects (n=22)

Twenty-two protocols were for reviews of the prevalence of symptoms or effects; 10 of these focused on a specific population. One was a protocol for a living review of the impact of Long COVID on Canadian healthcare workers (#61 McGuire, et al., 2023). Six were for reviews of any symptoms: in children (#63 Bergqvist, et al., 2023; and #71 Guo and Li, 2023), in patients in Africa (#69 Frallonardo, et al., 2023) or Brazil (#75 Mocruha, et al., 2023), and in people with HIV (#79 Shi, et al., 2023) or with cancer (#82 Xu and Li, 2023). Two were on specific symptoms in athletes, including cardiovascular symptoms (#72 Iyer and Simons, 2023), and oxygen uptake (#74 Lopes, et al., 2023). One protocol was on lung symptoms in children (#80 Tan and Marichu De Chavez, 2023).

Twelve protocols on symptoms or effects did not focus on a specific population. One was for the prevalence of Long COVID symptoms in general (#73 Liu and Deng, 2023).

The remaining 11 protocols focused on: chest symptoms (#62 Babar, et al., 2023), neurological symptoms (#64 Blanco, et al., 2023), sleep symptoms (#65 Chinvararak and Chalder, 2023), diabetes diagnoses (#66 Cocking, et al., 2023; and #67 Costa and Macedo Nascimento, 2023), chorioretinopathy diagnoses (#68 Elneny, et al., 2023), heart symptoms (#70 Ghasempour, et al., 2023, and #77 Schoene, et al., 2023), impact on male sexual hormones (#76 Puspaningrat, et al., 2023), anxiety and depression (#78 Shang, et al., 2023), or dermatological symptoms (#81 Wojtara and Rana, 2023).

Prevalence of symptoms or effects, and pathobiology or mechanisms (n=1)

One protocol focused on pathobiology or mechanisms and the prevalence of symptoms or effects, more specifically on brain biomarkers and brain imaging findings in adults with Long COVID (#83 Mohamed Elamin, et al., 2023).

Risk factors with or without prevalence of symptoms or effects (n=6)

Six protocols were for reviews on risk factors with or without prevalence of symptoms for Long COVID. One was for a review of reviews, focusing on bias in studying risk factors for Long COVID (#84 Hua, et al., 2023). Two protocols for systematic reviews of primary research, focused on the risks for dyspnoea (#88 Morgan, et al., 2023), and risk factors for dying from Long COVID (#85 de Macedo Couto, et al., 2023). One protocol focused on the risk of Long COVID in people who had antiviral medications (#86 Jiang, et al., 2023). Two protocols focused on risk factors in elderly people (#87 Liang, et al., 2023), and in patients with cancer (#89 Zhang and Huang, 2023).

Health and economics (n=1)

One protocol was for a review examining the economic burden associated with post-viral syndromes, including a section on Long COVID (#90 Kwon, et al., 2023).

1) Published Reviews

Treatment/rehabilitation (n=11)

Standard systematic reviews

1. Calvache-Mateo A, Heredia-Ciuro A, Martin-Nunez J, et al. Efficacy and safety of respiratory telerehabilitation in patients with Long COVID-19: a systematic review and meta-analysis. *Healthcare* 2023;11:12. doi: https://dx.doi.org/10.3390/healthcare11182519

Review aim: To identify, map, and synthesise the extent and nature of research activity on the use of telerehabilitation to support Long COVID-19 rehabilitation and examine the efficacy and safety of respiratory telerehabilitation in patients with Long COVID-19.

2. Capra AP, Ardizzone A, Crupi L, et al. Efficacy of palmitoylethanolamide and luteolin association on post-COVID olfactory dysfunction: a systematic review and meta-analysis of clinical studies. *Biomedicines* 2023;11:03. doi: https://dx.doi.org/10.3390/biomedicines11082189

Review aim: To assess the efficacy of CoUltraPEALut (a combination of micronised palmitoylethanolamide, an endogenous fatty acid amide, and luteolin, a natural antioxidant flavonoid), as an addition to olfactory training, in improving olfactory dysfunction-related outcomes in Long COVID-19 patients.

3. Estebanez-Perez MJ, Martin-Valero R, Vinolo-Gil MJ, Pastora-Bernal JM. Effectiveness of digital physiotherapy practice compared to usual care in Long COVID patients: a systematic review. *Healthcare* 2023;11:07. doi: https://dx.doi.org/10.3390/healthcare11131970

Review aim: To explore the effectiveness of digital physiotherapy practice interventions compared to usual care for adult patients with Long COVID by reporting the main changes in outcomes.

4. Gawey B, Yang J, Bauer B, et al. The use of complementary and alternative medicine for the treatment of gastrointestinal symptoms in Long COVID: a systematic review. *Therapeutic Advances in Chronic Disease* 2023;14:20406223231190548. doi: https://dx.doi.org/10.1177/20406223231190548

Review aim: To identify complementary and alternative medicine approaches that are useful for treating the gastrointestinal symptoms of Long COVID.

5. Marshall-Andon T, Walsh S, Berger-Gillam T, Pari AAA. Systematic review of post-COVID-19 syndrome rehabilitation guidelines. *Integrated Healthcare Journal* 2023;4:e000100. doi: https://dx.doi.org/10.1136/ihj-2021-000100

Review aim: To systematically review and summarise clinical and service guidelines for post-COVID-19 syndrome rehabilitation with the aim of informing clinical leads and commissioners what good practice looks like for the rehabilitation of patients affected by post-COVID-19 syndrome.

6. Melendez-Oliva E, Martinez-Pozas O, Cuenca-Zaldivar JN, et al. Efficacy of pulmonary rehabilitation in post-COVID-19: a systematic review and meta-analysis. *Biomedicines* 2023;11:07. doi: https://dx.doi.org/10.3390/biomedicines11082213

Review aim: To provide an update about the efficacy of pulmonary rehabilitation in patients with subacute and Long COVID-19, and its effects on dyspnoea, physical function, quality of life, psychological outcomes, and fatigue.

7. Pouliopoulou DV, Macdermid JC, Saunders E, et al. Rehabilitation interventions for physical capacity and quality of life in adults with post-COVID-19 condition: a systematic review and meta-analysis. *JAMA Network Open* 2023;6:e2333838. doi: https://dx.doi.org/10.1001/jamanetworkopen.2023.33838

Review aim: To assess whether rehabilitation interventions are associated with improvements in physical capacity (functional exercise capacity, muscle function, dyspnoea, and respiratory function) and quality of life in adults with post-COVID condition.

8. Sanchez-Garcia JC, Rentero M, Piqueras-Sola B, et al. Physical therapies in the treatment of post-COVID syndrome: a systematic review. *Biomedicines* 2023;11:11. doi: https://dx.doi.org/10.3390/biomedicines11082253

Review aim: To show the different therapies that exist for patients with post-COVID syndrome and to evaluate their efficacy.

9. Scott K, Ankrum S, Lindsey E, et al. Physical therapy management of postacute sequelae of COVID-19 in outpatient settings: a scoping review. *Cardiopulmonary Physical Therapy Journal* 2023;34:64-74. doi: https://dx.doi.org/10.1097/cpt.0000000000000217

Review aim: To summarise the available evidence related to the physical therapy management of post-acute sequalae of SARS-CoV-2 (PASC), in outpatient settings.

10. Torres G, Gradidge PJ. The quality and pattern of rehabilitation interventions prescribed for post-COVID-19 infection patients: a systematic review and meta-analysis. *Preventive Medicine Reports* 2023;35:102395. doi: https://dx.doi.org/10.1016/j.pmedr.2023.102395

Review aim: To investigate the quality of articles on exercise rehabilitation, and conduct a meta-analysis on experimental and observational rehabilitation intervention studies on cardiorespiratory fitness and pulmonary function in post-COVID-19 infection patients.

11. Yong SJ, Halim A, Halim M, et al. Experimental drugs in randomized controlled trials for Long-COVID: what's in the pipeline? A systematic and critical review. *Expert Opinion on Investigational Drugs* 2023;32:655-67. doi: https://dx.doi.org/10.1080/13543784.2023.2242773

Review aim: To summarise and evaluate completed and ongoing randomised controlled trials that investigate drug treatments for Long COVID, as well as to provide a critical appraisal of the drug potential in treating Long COVID.

Treatment or rehabilitation, and prevention (n=1)

Standard systematic reviews

12. Jennings S, Corrin T, Waddell L. A systematic review of the evidence on the associations and safety of COVID-19 vaccination and post COVID-19 condition. *Epidemiology and Infection* 2023;151:e145. doi: https://dx.doi.org/10.1017/S0950268823001279

Review aim: To assess the evidence on the risk of post-COVID-19 condition (PCC) with vaccination before or after COVID-19 or after developing PCC, and the safety of vaccination among those already experiencing PCC.

Treatment or rehabilitation, and pathobiology or mechanisms (n=1)

Standard systematic reviews

13. Fox T, Hunt B, Ariens R, et al. Plasmapheresis to remove amyloid fibrin(ogen) particles for treating the post-COVID-19 condition. *Cochrane Database of Systematic Reviews* 2023;7 doi: 10.1002/14651858.Cd015775

Review aim: (review 1) To summarise and appraise the research reports on amyloid fibrin(ogen) particles related to the post-COVID condition (PCC).

Review aim: (review 2) To assess the evidence on the safety and efficacy of plasmapheresis to remove amyloid fibrin(ogen) particles in individuals with the post-COVID condition from randomised controlled trials.

Treatment or rehabilitation, prevention, and prevalence of symptoms or effects (n=1)

Review of reviews and standard systematic review

14. Lewthwaite H, Byrne A, Brew B, Gibson PG. Treatable traits for Long COVID. *Respirology* 2023;16:16. doi: https://dx.doi.org/10.1111/resp.14596

Review aim: (review 1) To understand how a treatable traits approach could be applied to Long COVID, by identifying the most prevalent Long COVID treatable traits.

Review aim: (review 2) To understand how a treatable traits approach could be applied to Long COVID, by identifying the available evidence for strategies to target these traits.

Prevalence of symptoms and effects (n=20)

Review of reviews

15. Li H, Xia J, Bennett D, et al. Long-COVID-19 clinical and health outcomes: an umbrella review. *Therapeutic Advances in Infectious Disease* 2023;10:20499361231198335. doi: https://dx.doi.org/10.1177/20499361231198335

Review aim: To synthesise both qualitative and quantitative evidence on the prevalence and outcomes of the long-term effects of COVID-19.

16. Vandersteen C, Plonka A, Manera V, et al. Alzheimer's early detection in post-acute COVID-19 syndrome: a systematic review and expert consensus on preclinical assessments. *Frontiers in Aging Neuroscience* 2023;15:1206123. doi: https://dx.doi.org/10.3389/fnagi.2023.1206123

Review aim: To examine the potential for using remote digital assessments for pre-clinical Alzheimer's disease to identify impairments in post-acute COVID-19 syndrome patients; scrutinise the supporting evidence, and describe the recommendations of experts regarding their use.

Standard systematic reviews

17. AbdelMassih AF, Hanafy MH, ElAhmady M, et al. Non-multisystem inflammatory syndrome in children - postacute sequelae of paediatric COVID-19: autoimmune or autoinflammatory? A systematic review of the reported cases. *Rheumatology* 2023;3:132-68. doi: https://dx.doi.org/10.3390/rheumato3020011

Review aim: To review case reports of non-multisystem inflammatory syndrome in children (non-MIS-C) and post-acute sequelae of COVID-19 (PASC) in the paediatric population, and to determine the time between acute infection and the development of post-acute sequelae.

18. Bellia C, Andreadi A, D'Ippolito I, et al. Prevalence and risk of new-onset diabetes mellitus after COVID-19: a systematic review and meta-analysis. *Frontiers in Endocrinology* 2023;14:1215879. doi: https://dx.doi.org/10.3389/fendo.2023.1215879

Review aim: To assess the prevalence of diabetes and any types of gluco-metabolic abnormalities reported in patients who had been infected with SARS-CoV-2, at least 60 days after diagnosis; and to estimate the proportion of new-onset diabetes at least 60 days after diagnosis of SARS-CoV-2 infection.

19. Hawkings MJ, Vaselli NM, Charalampopoulos D, et al. A systematic review of the prevalence of persistent gastrointestinal symptoms and incidence of new gastrointestinal illness after acute SARS-CoV-2 infection. *Viruses* 2023;15:26. doi: https://dx.doi.org/10.3390/v15081625

Review aim: To examine the prevalence of persistent gastrointestinal symptoms and the incidence of new gastrointestinal illnesses following acute SARS-CoV-2 infection.

20. Jiang L, Li X, Nie J, et al. A systematic review of persistent clinical features after SARS-CoV-2 in the pediatric population. *Pediatrics* 2023;152:01. doi: https://dx.doi.org/10.1542/peds.2022-060351

Review aim: To present the prevalence and characteristics of the long-term clinical features of COVID-19 (Long COVID) in the global paediatric population.

21. Kaszuba M, Madej N, Pilinski R, Sliwka A. Post-COVID-19 symptoms in adults with asthma: systematic review. *Biomedicines* 2023;11:14. doi: https://dx.doi.org/10.3390/biomedicines11082268

Review aim: To assess the frequency and severity of long-term symptoms of COVID-19 in the population of asthma patients.

22. Kelly JD, Curteis T, Rawal A, et al. SARS-CoV-2 post-acute sequelae in previously hospitalised patients: systematic literature review and meta-analysis. *European Respiratory Review* 2023;32:30. doi: https://dx.doi.org/10.1183/16000617.0254-2022

Review aim: To identify post-acute sequelae of SARS-CoV-2 infection (PASC)-associated symptoms in previously hospitalised patients and determine the frequency and temporal nature of PASC.

23. Kerzhner O, Berla E, Har-Even M, et al. Consistency of inconsistency in Long-COVID-19 pain symptoms persistency: a systematic review and meta-analysis. *Pain Practice* 2023;21:21. doi: https://dx.doi.org/10.1111/papr.13277

Review aim: To evaluate the proportions of persisting pain symptoms experienced by individuals past the acute phase of COVID-19 and to identify their associated functional consequences and inflammatory correlates.

24. Linh TTD, Ho DKN, Nguyen NN, et al. Global prevalence of post-COVID-19 sleep disturbances in adults at different follow-up time points: a systematic review and meta-analysis. *Sleep Medicine Reviews* 2023;71:101833. doi: https://dx.doi.org/10.1016/j.smrv.2023.101833

Review aim: To estimate the prevalence of post-COVID sleep disturbances in the adult population.

25. Marchi M, Grenzi P, Serafini V, et al. Psychiatric symptoms in Long-COVID patients: a systematic review. *Frontiers in psychiatry Frontiers Research Foundation* 2023;14:1138389. doi: https://dx.doi.org/10.3389/fpsyt.2023.1138389

Review aim: To summarise the available evidence about the main psychiatric manifestations of Long COVID.

26. Marjenberg Z, Leng S, Tascini C, et al. Risk of Long COVID main symptoms after SARS-CoV-2 infection: a systematic review and meta-analysis. *Scientific Reports* 2023;13:15332. doi: https://dx.doi.org/10.1038/s41598-023-42321-9

Review aim: To summarise the relative risk of the main symptoms of Long COVID in people infected with SARS-CoV-2 compared to uninfected controls, as well as the difference in health-related quality of life (HRQoL) after infection.

27. Nazir A, Putri Salsabila SS, Bashari Muhammad H. Clinical and functional outcomes of COVID-19 survivors after hospitalization. Kesmas: *National Public Health Journal* 2023;18:4-10. doi: https://dx.doi.org/10.21109/kesmas.v18i3.7039

Review aim: To identify the clinical and functional outcomes in COVID-19 survivors after hospitalisation.

28. Nicotra A, Masserini F, Calcaterra F, et al. What do we mean by Long COVID? A scoping review of the cognitive sequelae of SARS-CoV-2 infection. *European Journal of Neurology* 2023;04:04. doi: https://dx.doi.org/10.1111/ene.16027

Review aim: To undertake a scoping review of the literature focusing on labels used to define post-COVID-19 syndrome, reported symptoms, time of onset from acute infection, and tools used to assess and collect these symptoms, with a specific focus on the cognitive ones.

29. Rasheed MA, Ballotin VR, Bigarella LG, Soldera J. Post-COVID-19 cholangiopathy: systematic review. *World Journal of Methodology* 2023;13:296-322. doi: https://dx.doi.org/10.5662/wjm.v13.i4.296

Review aim: To synthesise currently reported cases to assess the current state of knowledge on post-COVID-19 cholangiopathy.

30. Sherif ZA, Deverapalli M, Challa SR, et al. Potential long-term neurological and gastrointestinal effects of COVID-19: a review of adult cohorts. *World Journal of Methodology* 2023;13:323-36. doi: https://dx.doi.org/10.5662/wjm.v13.i4.323

Review aim: To examine the current knowledge and outcomes of long-term neurological and gastrointestinal (GI) symptoms of SARS-CoV-2 infection, in adults, including minority populations in the USA.

31. Sreelakshmi PR, Tandale BV, Jadhav AV, et al. A scoping review of persistent symptoms after COVID infection at different follow-up periods. *Indian Journal of Public Health* 2023;67:292-300. doi: https://dx.doi.org/10.4103/ijph.ijph_1178_22

Review aim: To collate evidence generated by longitudinal studies to understand the prevalence of Long COVID (persistent symptoms for up to three months and beyond) and how it varies across time periods from the initial infection, and across WHO regions.

32. Vilarello BJ, Jacobson PT, Tervo JP, et al. Olfaction and neurocognition after COVID-19: a scoping review. *Frontiers in Neuroscience* 2023;17:1198267. doi: https://dx.doi.org/10.3389/fnins.2023.1198267

Review aim: To elucidate whether the available literature supports olfaction as a biomarker for broader neurological disturbances in post-acute sequelae of COVID-19 among non-elderly, otherwise healthy adults following COVID-19.

33. Zuin M, Imazio M, Rigatelli G, et al. Risk of incident pericarditis after coronavirus disease 2019 recovery: a systematic review and meta-analysis. *Journal of Cardiovascular Medicine* 2023;24:822-28. doi: https://dx.doi.org/10.2459/JCM.0000000000001536

Review aim: To assess the risk of incident pericarditis in COVID-19 recovered patients.

34. Zuin M, Mazzitelli M, Rigatelli G, et al. Risk of ischemic stroke in patients recovered from COVID-19 infection: A systematic review and meta-analysis. *European Stroke Journal* 2023:23969873231190432. doi: https://dx.doi.org/10.1177/23969873231190432

Review aim: To assess the risk of incident ischaemic stroke as post-acute sequelae of SARS CoV-2 infection.

Prevalence of symptoms or effects, and mechanisms (n=1)

Standard systematic review

35. Kiyak C, Ijezie OA, Ackah JA, et al. Topographical distribution of neuroanatomical abnormalities following COVID-19 invasion : a systematic literature review. *Clinical Neuroradiology* 2023;11:11. doi: https://dx.doi.org/10.1007/s00062-023-01344-5

Review aim: To collate early evidence on the frequency of occurrence and topographical distribution of neuroanatomical abnormalities following COVID-19 infection, with a focus on acute and chronic (including possible Long COVID) disease phases.

Prevalence of symptoms or effects, treatment, and economics (n=1)

Standard systematic reviews

36. Espinoza C, and Martella D. Cognitive functions in COVID-19 survivors, approaches strategies, and impact on health systems: a qualitative systematic review. *European Archives of Psychiatry & Clinical Neuroscience* 2023;30:30. doi: https://dx.doi.org/10.1007/s00406-023-01662-2

Review aim: To conduct a qualitative systematic review on long-term cognitive dysfunction in middle-aged and older survivors of COVID19, identifying implemented intervention strategies and their impact on healthcare systems.

Risk factors with or without prevalence of symptoms or effects (n=1)

Standard systematic reviews

37. Alilou S, Zangiabadian M, Pouramini A, et al. Radiological findings as predictors of COVID-19 lung sequelae: a systematic review and meta-analysis. *Academic Radiology* 2023;06:06. doi: https://dx.doi.org/10.1016/j.acra.2023.06.002

Review aim: To explore the radiological predictors of post-COVID-19 pulmonary fibrosis and incomplete absorption of pulmonary lesions.

Risk factors and mechanisms, with or without prevalence of symptoms or effects (n=1)

Standard systematic reviews

38. Nyasulu PS, Tamuzi JL, Erasmus RT. Burden, causation, and particularities of Long COVID in African populations: a rapid systematic review. *IJID Regions* 2023;8:137-44. doi: https://dx.doi.org/10.1016/j.ijregi.2023.08.004

Review aim: To determine the prevalence of Long COVID, its most common symptoms, comorbidities, and pathophysiological mechanisms in African populations.

Pathobiology or mechanisms (n=6)

Standard systematic reviews

39. Akbari A, Hadizadeh A, Islampanah M, et al. COVID-19, G protein-coupled receptor, and renin-angiotensin system autoantibodies: systematic review and meta-analysis. *Autoimmunity Reviews* 2023;22:103402. doi: https://dx.doi.org/10.1016/j.autrev.2023.103402

Review aim: To collect all reports of autoantibodies against G-protein coupled receptors (GPCRs) and the renin-angiotensin system (RAS) in COVID-19 patients at different stages of disease severity, and in patients who suffered Long COVID or post-COVID complications.

NB only a section of this review is relevant.

40. Guinto E, Gerayeli FV, Eddy RL, et al. Post-COVID-19 dyspnoea and pulmonary imaging: a systematic review and meta-analysis. *European Respiratory Review* 2023;32:30. doi: https://dx.doi.org/10.1183/16000617.0253-2022

Review aim: To determine the prevalence of chest imaging abnormalities in COVID-19 patients at follow-up.

41. Seyedmirzaei H, Faramarzpour M, Saghazadeh A, et al. Post-COVID-19 depression and serum interleukin 6 levels: a systematic review and meta-analysis of COVID-19 convalescents with and without depression. *World Journal of Biological Psychiatry* 2023:1-11. doi: https://dx.doi.org/10.1080/15622975.2023.2242928

Review aim: To compare interleukin 6 levels in convalescents with and without post-COVID depression to shed light on the underlying neuroimmunological mechanisms of depression.

42. Udeh R, Utrero-Rico A, Dolja-Gore X, et al. Lactate dehydrogenase contribution to symptom persistence in Long COVID: a pooled analysis. *Reviews in Medical Virology* 2023:e2477. doi: https://dx.doi.org/10.1002/rmv.2477

Review aim: To evaluate the evidence for an association between plasma lactate dehydrogenase (LDH) and Long COVID and to explore the contribution of LDH to symptoms persistent across the distinct post-acute sequelae of COVID-19 (PASC) domains.

43. Vasilev Y, Blokhin I, Khoruzhaya A, et al. Routine brain MRI findings on the long-term effects of COVID-19: a scoping review. *Diagnostics* 2023;13:30. doi: https://dx.doi.org/10.3390/diagnostics13152533

Review aim: To determine what is known about the changes in the brain observed on routine MRI in adult patients who have recovered from the symptoms of acute COVID-19.

44. Shafiee A, Seighali N, Teymouri A, et al. Levels of brain-derived neurotrophic factor (BDNF) among patients with COVID-19: a systematic review and meta-analysis. *European Archives of Psychiatry & Clinical Neuroscience* 2023;30:30. doi: https://dx.doi.org/10.1007/s00406-023-01681-z

Review aim: To synthesise the available evidence on the profile of brain-derived neurotrophic factor in COVID-19.

NB: Section on Long COVID - only one study assessed the BDNF levels in Long COVID patients.

Economics (n=1)

Standard systematic reviews

45. Katz GM, Bach K, Bobos P, et al. Understanding how post-COVID-19 condition affects adults and health care systems. *JAMA Health Forum* 2023;4:e231933. doi: https://dx.doi.org/10.1001/jamahealthforum.2023.1933

Review aim: To inform health care resource and policy planning and how health care systems may optimally deliver care to people with post-COVID-19 condition.

Public or patient involvement (n=1)

Standard systematic reviews

46. Dalko K, Kraft B, Jahn P, et al. Cocreation of assistive technologies for patients with Long COVID: qualitative analysis of a literature review on the challenges of patient involvement in health and nursing sciences. *Journal of Medical Internet Research* 2023;25:e46297. doi: https://dx.doi.org/10.2196/46297

Review aim: To address the following questions: what are the tasks and challenges associated with the involvement of patient groups? What lessons can be learned regarding the adequate involvement of patients with Long COVID?

2) Protocols for completed but not published reviews related to Long COVID (n=3)

Prevalence of symptoms or effects (n=2)

47. Abd Razak et al. Post-COVID syndrome prevalence: a systematic review and meta-analysis. PROSPERO 2023 CRD42023435280 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023435280

Review question(s): What is the worldwide prevalence of post-COVID syndrome?

48. Tang et al. Long COVID in patients with rheumatic diseases: a systematic review and meta-analysis. PROSPERO 2023 CRD42023451768 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023451768

Review question(s): To investigate the prevalence and risk factors of Long COVID in rheumatic patients.

Risk factors with or without prevalence of symptoms or effects (n=1)

49. Sha'ari et al. Cardiovascular diseases as the risk factors of post-COVID syndrome: a systematic review. PROSPERO 2023 CRD42023440834 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023440834

Review question: Do cardiovascular diseases increase the risk of post-COVID-19 syndrome?

Protocols for ongoing reviews related to Long COVID (n=41)

Treatment (n=8)

50. Ata et al. Protocol for a systematic review of clinical practice guidelines for the management of Long COVID. PROSPERO 2023 CRD42023460901 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023460901

Review question(s): What are the existing guidelines and recommendations for the management of Long COVID (also known as post-acute sequelae of SARS-CoV-2 infection or PASC)?

51. Correia et al. Effectiveness of pulmonary and physical rehabilitation exercise-based programs in patients with post-acute sequelae of COVID-19 (PASC) depending on the diagnosis of Myopathic Encephalopathy/Chronic Fatigue Syndrome (ME/CFS): a systematic review. PROSPERO 2023 CRD42023451057 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023451057

Review question(s): Are exercise-based rehabilitation programs for respiratory and/or peripheral muscles effective in improving fatigue, functionality and quality of life in PASC? When patients are diagnosed with ME/CFS and PASC, is the effectiveness of exercise-based rehabilitation different from PASC alone?

52. Hutchins et al. Cognitive interventions and rehabilitation to address Long-COVID symptoms: a systematic review. PROSPERO 2023 CRD42023452504 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023452504

Review question(s): What cognitive interventions and cognitive rehabilitative strategies are effective in treating deficits that are a result of Long COVID symptoms?

53. Mota et al. Integrative and complementary practices in the rehabilitation of olfactory dysfunction in patients with COVID-19. PROSPERO 2023 CRD42023458158 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023458158

Review question(s): What is the effect of using integrative and complementary practices in the rehabilitation of olfactory dysfunction in patients with COVID-19?

54. Nugroho Supranoto et al. The role of initial immunomodulator combination therapy for multisystem inflammatory syndrome in children associated with COVID-19: an updated systematic review and meta-analysis of cohort studies. PROSPERO 2023 CRD42023442913 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023442913

Review question(s): We conducted this study to provide an updated review with the highest level of evidence from a previously published article comparing the combination of immunomodulator therapy using intravenous immunoglobulin (IVIG) and glucocorticoids with IVIG alone or glucocorticoids alone.

55. Rodríguez García et al. Effectiveness of psychotherapy in reducing suicidal ideation in adolescents post COVID 19: a systematic review. PROSPERO 2023 CRD42023454865 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023454865

Review question(s): What is the effectiveness of psychotherapy to reduce suicidal ideation in post-COVID 19 adolescents?

56. Romanet et al. Effects of physiotherapy on persisting dyspnoea in people with continuing respiratory discomfort following severe SARS-CoV-2 infection. PROSPERO 2023 CRD42023427464 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023427464

Review question: What are the potential physiotherapy interventions to modulate dyspnoea following hospitalised severe COVID-19?

57. Santos Gomes Jorge and Wibelinger. Effect of the Pilates method on post-COVID syndrome: a systematic review. PROSPERO 2023 CRD42023460494 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023460494

Review question(s): What are the effects of the Pilates method on the health of individuals with post-COVID syndrome?

Treatment and prevention (n=1)

Standard systematic review

58. Markus et al. Impact of COVID-19 vaccine before or after SARS-CoV-2 infection on post-COVID 19 conditions: a systematic literature review. PROSPERO 2023 CRD42023446417 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023446417

Review question(s): 1. Assess the impact of receiving any COVID-19 vaccine (any dose, manufacturer, or platform) prior to SARS-CoV-2 infection on PCC (i.e., prevalence, severity, duration). 2. Assess the impact of receiving any COVID-19 vaccine (any dose, manufacturer, or platform) after SARS-CoV-2 infection or after developing PCC on symptom resolution attenuation, duration, and severity.

Prevention (n=2)

Standard systematic reviews

59. Gutfreund et al. The effectiveness of COVID-19 vaccines in the prevention of post-COVID conditions in the pediatric population: a systematic literature review and meta-analysis. PROSPERO 2023 CRD42023456888 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023456888

Review question(s): We intend to perform a systematic review and meta-analysis to evaluate the COVID-19 vaccine effectiveness among paediatric population studying the COVID-19 post-conditions (it may also be known as Long COVID, long-haul COVID, post-acute COVID-19, long-term effects of COVID, or chronic COVID).

60. Patel and Korsun. A systematic review of the protective effects of booster dose of COVID-19 vaccination regarding post-acute COVID-19 syndrome. PROSPERO 2023 CRD42023461326 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023461326

Review question(s): In adult populations who have been previously infected with COVID-19 does the administration of a COVID-19 booster vaccine compared to people who received only the full dose of COVID-19 vaccine provide protective effects in terms of post-acute COVID-19 syndrome?

Prevalence of symptoms or effects (n=22)

Living review

61. McGuire et al. Impact of post-COVID-19 condition on the Canadian healthcare workforce: a living systematic review. PROSPERO 2023 CRD42023446930 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023446930

Review question(s): What is the incidence and prevalence of post-COVID condition (PCC) and PCC-related symptoms in health care workers (HCW)? What is the type, severity and duration of PCC-related symptoms observed in HCW? How does PCC in HCWs affect the healthcare worker occupation and the overall healthcare workforce?

Standard systematic reviews

62. Babar et al. One-year outcomes of COVID-19 on chest imaging: a systematic review and meta-analysis. PROSPERO 2023 CRD42023447766 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023447766

Review question What are the long term (over one year) CT findings in patients with COVID-19?

63. Bergqvist et al. Development and severity of pediatric Long COVID-19 and MIS-C: accounting for race, ethnicity, and other social determinants of health: a systematic review and meta-analysis. PROSPERO 2023 CRD42023448599 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023448599

Review question(s): Paediatric patients with Long COVID, to what extent does race, ethnicity and other social determinants of health impact development of disease and severity of disease and outcomes?

64. Blanco et al. Neurological manifestations by COVID-19: a systematic review. PROSPERO 2023 CRD42023461512 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023461512

Review question(s): What are the neurological manifestations caused by COVID-19?

65. Chinvararak and Chalder. Prevalence of sleep disturbance in patients with Long COVID: a systematic review and meta-analysis. PROSPERO 2023 CRD42023453342 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023453342

Review question(s): What is the prevalence of sleep disturbance in patients with Long COVID?

66. Cocking et al. New onset diabetes mellitus post COVID-19 infection: a systematic review and meta-analysis. PROSPERO 2023 CRD42023457569 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023457569

Review question(s): 1. What is the incidence of new-onset diabetes mellitus, diabetic ketoacidosis and hyperglycaemia post COVID-19 infection? 2. How does new-onset diabetes mellitus post COVID-19 infection affect the mortality rate and rates of ICU admission?

67. Costa and Macedo Nascimento. Interrelation between diabetes mellitus type 2 and its post COVID-19 diagnosis. PROSPERO 2023 CRD42023438523 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023438523

Review question(s): Should people with post COVID-19 infection be screened for diabetes mellitus type 2? What is the incidence of type 2 diabetes post-COVID among the study subjects? What is the relative risk of type 2 diabetes post-COVID? What is the most prevalent age group among the study subjects? What is the most prevalent gender among the study subjects? What is the most prevalent race among the study subjects? What are the risk groups?

68. Elneny et al. Chorioretinopathy following COVID-19 infection: a comprehensive systematic review of case reports and case series. PROSPERO 2023 CRD42023457712 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023457712

Review question: Chorioretinopathy as a post-infection sequela of COVID-19.

69. Frallonardo et al. Incidence and burden of Long COVID in Africa: a systematic review and meta-analysis. PROSPERO 2023 CRD42023447874 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023447874

Review question: What is the incidence of Long COVID signs and symptoms in Africa?

70. Ghasempour et al. Cardiac imaging manifestations of chronic COVID-19 syndrome: a systematic review. PROSPERO 2023 CRD42023404745 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023404745

Review question(s): In chronic COVID-19 syndrome patients, what are the cardiac alterations in imaging compared to controls?

71. Guo and Li. Long COVID-19 symptoms in children during the COVID-19 epidemic: a systematic review and meta-analysis. PROSPERO 2023 CRD42023442784 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023442784

Review question(s): 1. What is the prevalence of long-term symptoms among infected children? 2. What are the long-term complications of COVID-19 for children? 3. What are the risk factors associated with prolonged COVID in children?

72. Iyer and Simons. Cardiovascular sequelae post COVID-19 infection, in athletes: an updated systematic review. PROSPERO 2023 CRD42023449451 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023449451

Review question(s): What are the most common cardiovascular complications post COVID-19 infection? Are the newer variants any different than older ones in causing the above? How do the newer variants affect return to play in athletes?

73. Liu and Deng. The prevalence of long-term sequelae of COVID-19 at 3 years after SARS-CoV-2 infection: a systematic review and meta-analysis. PROSPERO 2023 CRD42023466957 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023466957

Review question(s): What is the prevalence of long-term sequelae of COVID-19 at three years after initial SARS-CoV-2 infection? Which Long COVID symptom clusters will persist beyond three years after SARS-CoV-2 infection? Is there any difference in patients with different characteristics?

74. Lopes et al. A systematic review of maximal oxygen uptake dynamics in post-COVID-19 elite athletes. PROSPERO 2023 CRD42023456799 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023456799

Review question(s): How does post-COVID-19 maximal oxygen uptake dynamics influence elite athletes' return to sport?

75. Mocruha et al. Long COVID in Brazil: long lasting symptoms and epidemiological profile, a systematic review. PROSPERO 2023 CRD42023459497 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023459497

Review question(s): 1. What are the most frequent post COVID-19 conditions in Brazil? 2. What is the epidemiological profile of the population affected by Long COVID? 3. What is the prevalence of Long COVID symptoms, their duration and severity when stratified by population profile?

76. Puspaningrat et al. Effect of SARS-CoV-2 viral infection on male sexual hormones levels post COVID-19 exposure: a systematic review and meta-analysis. PROSPERO 2023 CRD42023445406 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023445406

Review question(s): Is there any effect of SARS-CoV-2 viral infection on testosterone, free testosterone, luteinising hormone, and follicle stimulating hormone levels post COVID-19 exposure?

77. Schoene et al. Heart rate variability in patients with post COVID-19 condition: a systematic review and meta-analysis. PROSPERO 2023 CRD42023458309 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023458309

Review question: Does COVID-19 have an impact on time- and frequency-related indices of heart rate variability (HRV) in patients with post COVID-19 condition compared with healthy controls (without COVID-19 and post-COVID-19 condition)?

78. Shang et al. Trends in anxiety and depression levels of COVID-19 patients 2 years after hospital discharge: a systematic review and meta-analysis. PROSPERO 2023 CRD42023463586 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023463586

Review question: What is the prevalence of anxiety and depression among COVID-19 patients two years after discharge? Is it going up or down compared with just after discharge?

79. Shi et al. Post-acute COVID-19 sequelae among people with HIV: a systematic review and meta-analysis. PROSPERO 2023 CRD42023445493 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023445493

Review question(s): 1. Whether HIV patients are at a higher risk of Post-acute COVID-19 sequelae? 2. What's the risk factors of post-acute COVID-19 sequelae among HIV patients? 3. What are the potential mechanisms of the association between HIV infection and post-acute COVID-19 sequelae (e.g., persistent inflammatory)?

80. Tan and Marichu De Chavez. Pulmonary function test of children and adolescents post COVID-19 infection: a systematic review and meta-analysis. PROSPERO 2023 CRD42023449824 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023449824

Review question(s) What is the pulmonary function test result of paediatric patients post COVID-19 infection?

81. Wojtara and Rana. Examining Long COVID-19 dermatologic manifestations. PROSPERO 2023 CRD42023454025 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023454025

Review question(s): What are the dermatological manifestations of Long or post-acute COVID-19?

82. Xu and Li. Long COVID in cancer patients: a systematic review and meta-analysis. PROSPERO 2023 CRD42023456665 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023456665

Review question(s): Long COVID in cancer patients.

Prevalence of symptoms or effects, and pathobiology or mechanisms (n=1)

83. Mohamed Elamin et al. Investigating brain biomarkers and brain imaging findings in adults with Long COVID: a systematic review. PROSPERO 2023 CRD42023448894 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023448894

Review question(s): 1. What are the brain biomarkers findings that are found in adults with Long COVID? 2. What are the brain imaging findings that are found in adult with Long COVID?

Risk factors with or without prevalence of symptoms or effects (n=6)

Systematic review of reviews

84. Hua et al. Biases and limitations in observational studies of Long COVID: a rapid umbrella review of systematic reviews. PROSPERO 2023 CRD42023434323 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023434323

Review question(s): What are the incidence, prevalence and risk factors for Long COVID? What kinds of biases and limitations affect the interpretation of observational studies of Long COVID prevalence, incidence and risk factors?

Standard systematic reviews

85. de Macedo Couto et al. Factors associated with mortality from post-COVID conditions: a systematic review protocol. PROSPERO 2023 CRD42023455369 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023455369

Review question(s): 1. What factors are associated with mortality from long-term COVID (post-COVID conditions)?

86. Jiang et al. Early use of antiviral agents and the risk of post-COVID condition: a systematic review and meta-analysis. PROSPERO 2023 CRD42023462510 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023462510

Review question(s): Whether the early use of antiviral agents reduces the risk of post-COVID condition?

87. Liang et al. Associations between potential risk factors and Long COVID-19 syndrome in elderly adults: a systematic review and meta-analysis. PROSPERO 2023 CRD42023440431 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023440431

Review question(s): Long COVID syndrome is a comprehensive heterogeneous syndrome that has impacted the health of millions globally, especially elderly patients. Therefore, recognition of the underlying risk factors to elucidate which one may be at risk of becoming Long COVID syndrome is very important as it could support early and appropriate clinical treatment.

88. Morgan et al. Multifactorial model of dyspnea in individuals with post-COVID-19. PROSPERO 2023 CRD42023466713 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023466713

Review question(s): What are the risk factors, predictors, and causes of persistent dyspnoea in individuals with post-COVID-19? Can a multifactorial model of persistent dyspnoea in post-COVID-19 be developed?

89. Zhang and Huang. Prevalence and risk factors of Long COVID in patients with cancer: a systematic review and meta-analysis. PROSPERO 2023 CRD42023465554 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023465554

Review question(s): Given the importance of Long COVID, we conducted this systematic review and meta-analysis of published studies to investigate the prevalence and risk factors of Long COVID in patients with cancer. We further estimated the main symptoms of patients with Long COVID and cancer.

Health and economics (n=1)

90. Kwon et al. Systematic review of the economic evaluation and burden of post-viral syndromes following respiratory viral infections including Long COVID. PROSPERO 2023 CRD42023454595 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023454595

Review question(s): What is the economic burden of post-viral syndromes (symptoms remaining 12 weeks after acute infection) following respiratory viral infections of recent pandemics – severe acute respiratory syndrome (SARS CoV-1), Middle eastern respiratory syndrome (MERS), SARS-CoV-2 (COVID-19), and influenza A/H1N1 (Swine Flu) – in terms of losses in health utilities and quality-adjusted life-years and healthcare and societal costs, and what are the results of economic evaluations of their treatments?

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 October 02, 2023

Date searched: 3rd October 2023

Records retrieved: 353

1 Post-Acute COVID-19 Syndrome/ (2473)
2 COVID-19 post-intensive care syndrome.mp. (5)
3 COVID-19/ or SARS-CoV-2/ (246770)
4 Syndrome/ (123088)
5 Survivors/ (30735)
6 4 or 5 (153702)
7 3 and 6 (1058)
8 1 or 2 or 7 (3449)
9 ((long adj (covid$ or covid-19 or covid19 or coronavirus)) or longcovid$).ti,ab,kf,ot,bt. (3979)
10 ((post adj (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) or postcovid$).ti,ab,kf,ot,bt. (8903)
11 ((post acute or postacute) adj2 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (875)
12 PASC.ti,ab,kf,ot,bt. (750)
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. (2523)
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. (314)
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. (2128)
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. (3876)
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. (131)
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. (252)
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. (2961)
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. (8818)
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. (2766)
22 or/9-21 (28218)
23 8 or 22 (28697)
24 systematic review.mp,pt. (317206)
25 search:.tw. (657612)
26 meta analysis.mp,pt. (286178)
27 review.pt. (3216262)
28 24 or 25 or 26 or 27 (3744683)
29 23 and 28 (4612)

30 qualitative review$.ti,ab,kf,ot,bt. (1785)
31 realist synthes$.ti,ab,kf,ot,bt. (387)
32 realist review$.ti,ab,kf,ot,bt. (682)
33 (meta-synthes$ or metasynthes$).ti,ab,kf,ot,bt. (2145)
34 (living adj2 (review$ or map$)).ti,ab,kf,ot,bt. (747)
35 pooled analysis.ti,ab,kf,ot,bt. (12799)
36 or/30-35 (18362)
37 23 and 36 (66)
38 29 or 37 (4618)
39 (202307$ or 202308$ or 202309$ or 202310$).dt. (394978)
40 38 and 39 (353)
41 exp animals/ not humans.sh. (5159763)
42 40 not 41 (353)
43 preprint.pt. (13952)
44 42 not 43 (353)

CINAHL Plus
via Ebsco https://www.ebsco.com/
Date range: Inception to 20231002
Date searched: 3rd October 2023
Records retrieved: 241

S1(MH "Post-Acute COVID-19 Syndrome")957
S2TI (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*)1,329
S3TI (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*)1,614
S4TI (("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))344
S5TI PASC OR AB PASC103
S6TI (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))573
S7TI (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))269
S8TI ((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 ((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))1,024
S9TI (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))911
S10TI ((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))52

S11TI ((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))95
S12TI (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))1,067
S13TI (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))4,122
S14TI ((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))903
S15S1 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 10,142
S16(MH "Systematic Review")126,436
S17(ZT "systematic review")147,714
S18(ZT "meta analysis")54,196
S19(MH "Meta Analysis")71,486
S20TI (meta-analys* or metaanaly*) OR AB (meta-analys* or metaanaly*)110,445
S21TI systematic* N1 review* OR AB systematic* N1 review*156,006
S22S16 OR S17 OR S18 OR S19 OR S20 OR S21261,026
S23(ZT "review")375,344
S24AB systematic* or AB methodologic* or AB quantitative* or AB research* or AB literature* or AB studies or AB trial* or AB effective*2,972,767
S25(S23 AND S24)170,733
S26S22 OR S25422,882
S27S15 AND S26601
S28(MH "Meta Synthesis")2,231
S29TI qualitative N1 review* OR AB qualitative N1 review*3,946
S30TI (realist N1 (review* or synthes*)) OR AB (realist N1 (review* or synthes*))563
S31TI (meta-synthes* or metasynthes*) OR AB (meta-synthes* or metasynthes*)1,852
S32TI (living N2 (review* or map*)) AND (living N2 (review* or map*))227
S33TI pooled N1 analys* OR AB pooled N1 analys*8,328
S34S28 OR S29 OR S30 OR S31 OR S32 OR S3315,584
S35S15 AND S3428
S36S27 OR S35612
S37EM 202306-94,262
S38(ZD "in process")1,602,248
S39S37 OR S381,696,510
S40S36 AND S39241

Cochrane Database of Systematic Reviews (CDSR)
via Wiley http://onlinelibrary.wiley.com/
Issue: 10 of 12, October 2023
Date searched: 3rd October 2023

Records retrieved: 2

#1MeSH descriptor: [Post-Acute COVID-19 Syndrome] this term only62
#2MeSH descriptor: [COVID-19] this term only4786
#3MeSH descriptor: [SARS-CoV-2] this term only2393
#4MeSH descriptor: [Syndrome] this term only6328
#5MeSH descriptor: [Survivors] this term only1547
#6#2 or #34999
#7#4 or #57870
#8#6 and #755
#9#1 or #8110
#10(long next (covid* or covid-19 or covid19 or coronavirus) or longcovid*):ti,ab,kw313
#11(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,kw602
#12((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,kw1079
#13PASC:ti,ab,kw55
#14(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,kw136
#15(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,kw32
#16((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,kw674
#17(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,kw216
#18((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,kw1082
#19((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,kw486
#20(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,kw176
#21(after next (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)):ti,ab,kw274
#22((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,kw147
#23{OR #10-#22}2351
#24#9 or #23 with Cochrane Library publication date Between Jun 2023 and Oct 2023, in Cochrane Reviews, Cochrane Protocols2

Epistemonikos
https://www.epistemonikos.org/
Date searched: 3rd October 2023
Records retrieved: 317

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 07/07/2023 onwards, broad synthesis = 5, SR = 64

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 07/07/2023 onwards, broad synthesis = 0, SR = 13

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 07/07/2023 onwards, broad synthesis = 0, SR = 0

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 07/07/2023 onwards, broad synthesis = 2, SR = 19

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 07/07/2023 onwards, broad synthesis = 0, SR = 0

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 07/07/2023 onwards, broad synthesis = 3, SR = 56

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 07/07/2023 onwards, broad synthesis = 1, SR = 38

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 07/07/2023 onwards, broad synthesis = 1, SR = 2

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 07/07/2023 onwards, broad synthesis = 2, SR = 17

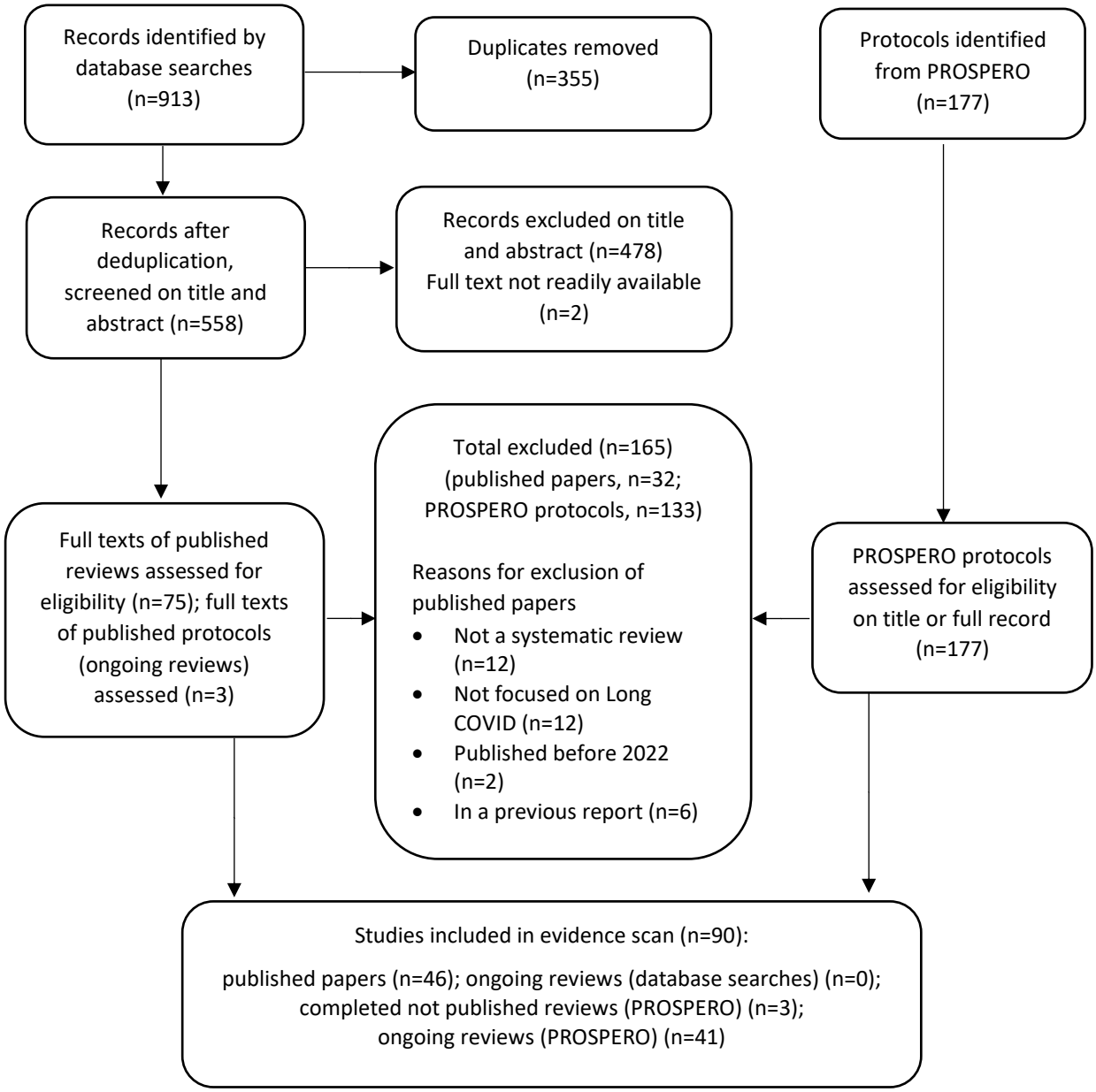
10. (title:(ongoing OR lasting OR prolonged OR fluctuat* OR residual* OR continu* OR linger*) OR abstract:(ongoing OR lasting OR prolonged OR fluctuat* OR residual* OR continu* OR linger*)) AND (title:(symptom* OR effect* OR complication* OR sequela* OR syndrome OR illness* OR disorder* OR dysfunction* 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 07/07/2023 onwards, broad synthesis = 13, SR = 81

PROSPERO search strategy

https://www.crd.york.ac.uk/prospero/
Searched from 7th July to 3rd October, 2023
Records identified: 177

#1 long COVID OR post COVID OR PASC(1005)
#2 persisting OR persistent OR long term OR ongoing OR prolonged OR lingering OR dysfunction OR recovered OR survivors OR long haul OR long hauler OR long haulers OR post discharge OR postdischarge OR sequela OR sequelae OR chronic OR post-acute(72762)
#3 COVID OR COVID-19 OR COVID19 OR coronavirus OR SARS-CoV-2 OR SARS-CoV2 OR SARSCoV2 OR SARSCoV-2 OR 2019-nCoV(10791)
#4 #3 AND #2(3472)
#5 #1 OR #4(3817)
#6 * Where CD FROM 07/07/2023 TO 03/10/2023(13924)
#7 #6 AND #5(177)

Appendix 2: Flow of studies through the review



NB Two published papers (Fox, et al., 2023 and Lewthwaite, et al., 2023) reported two reviews.

Appendix 3: Summary of reports and updates

Table 2: Summary of reviews (November 2021 to October 2023)

Report date	Oct 2023	July 2023	April 2023	Jan 2023	Oct 2022	July 2022	April 2022	Nov 2021
Period searched	Jul to Oct '23	Apr to Jul '23	Jan to Apr '23	Oct '22 to Jan '23	Jul to Oct '22	Apr to Jun '22	Nov '21 to Mar '22	Up to Nov '21
Primary focus by review type								
Published reviews	**46**	**31**	**37**	**50**	**29**	**28**	**54**	**51**
Treatment	11	5	5	5	5	3	11	3
Treatment and prevention	1	1	2		2			
Treatment and pathobiology	1							
Treatment, prevention and prevalence	1							
Prevention			1	2	1			1
Health and Social					1			
Prevalence	20	16	21	31	19	22	38	47
Prevalence and treatment		1						
Prevalence and pathobiology		1	1					
Prevalence, treatment, and economics	1							
Risk factors	1	6	3	8		3		
Risk factors and treatment				1	1			
Risk factors and prevention				1				
Pathobiology	6	1	3	2				
Risk factors and pathobiology	2						5	
Health and economics	1							
Public, patient involvement	1							
Treatment, prevention, prevalence, pathobiology, and diagnosis			1					
Completed not published	**3**	**1**	**5**		**2**		**5**	**9**
Lived experience								1
Treatment		1	2				1	1
Prevalence	2		3		2		4	7
Risk factors	1							
Ongoing reviews (protocols)	**41**	**52**	**68**	**56**	**63**	**59**	**73**	**77**
Treatment	8	26	27	33	24	12	17	15
Treatment and prevention	1		1		4			
Prevention	2	2		1		2	4	
Health and Social					1	1		
Prevalence	22	12	18	13	30	31	47	59
Prevalence and treatment		1		1				
Prevalence and pathobiology	1							
Risk factors	6	6	13	4		10		
Risk Factors and prevention				1				
Pathobiology		3	4	3		3		
Risk factors and pathobiology		1			4		5	
Diagnosis or monitoring tools			3					
Health and economics	1	1	1					3
Experiences			1					

Treatment = treatment or rehabilitation; prevalence = prevalence of symptoms or effects; Risk factors = risk factors with or without prevalence of symptoms or effects; pathobiology = pathobiology or mechanisms

NB: Caution is required in drawing direct comparisons across time. Records for the October 2022 and subsequent 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 2022 reports. The November report searched the COVID-19 living map, as the main source, and covered a longer period than other reports.

The NIHR Policy Research Programme Reviews Facility aims to put the evidence into development and implementation of health policy through:

- Undertaking policy-relevant systematic reviews of health and social care research
- Developing capacity for undertaking and using reviews
- Producing new and improved methods for undertaking reviews
- Promoting global awareness and use of systematic reviews in decision-making

The Reviews Facility is a collaboration between the following centres:
EPPI Centre (Evidence for Policy and Practice Information Centre),
UCL Institute of Education, University College London;
CRD (Centre for Reviews and Dissemination), University of York;
and the London School of Hygiene and Tropical Medicine.

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