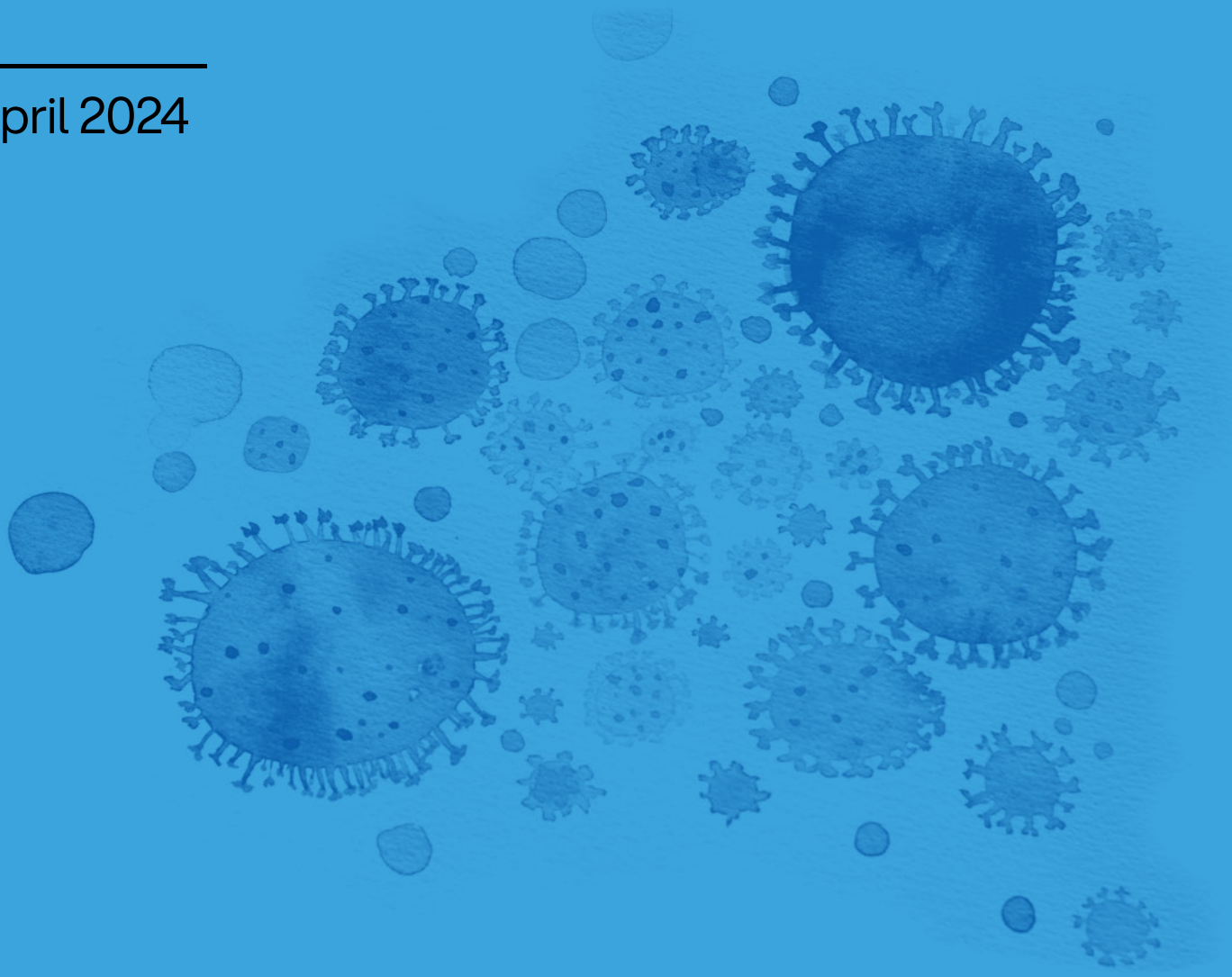
NIHR Policy Research Programme Reviews Facility

Supporting national policy development and implementation

Reviews on Long COVID

A scope of the literature: update

April 2024



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Reviews on Long COVID: A scope of the literature. Update April 2024

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Summary

- For this update, we identified 36 published reviews and 63 review protocols for Long COVID.
- The number of reviews (n=36) is fewer than in January 2024 (n=42), and October 2023 (n=46) but more than in July 2023 (n=31), and similar to April 2023 (n=37).
- Most reviews were focused on the prevalence of symptoms or effects (21/36), which remains consistent with earlier reports.
- We identified five reviews on treatment or rehabilitation, and five on risk factors with or without prevalence; both numbers are lower than last quarter (treatment n=7 and risk n=9).
- We identified two reviews on pathobiology or mechanisms; the same number as in the January 2024 report.
- The number of protocols (n=63) was greater than in January 2024 (n=42), October (n=44) and July (n=53), but less than in April 2023 (n=73).
- As in previous reports, the largest two categories of protocols focused on the prevalence of symptoms or effects (24/63), and treatment or rehabilitation (21/63).
- Eight protocols were focused on risk factors with or without prevalence, and four were on pathobiology or mechanisms; these numbers are similar to those in previous reports.

Introduction

This is the ninth update (tenth 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 October 2023 to January 2024.[1]

For the current update, we identified systematic reviews and review protocols focused on Long COVID that were published between early January and early April 2024. 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 April, 2024 and were limited by date to capture those records added to the databases since the last update searches in January 2024. No language restrictions were applied. A further search of PROSPERO was undertaken, by the review team, up to the 4th April, 2024 to identify any new ongoing reviews. Due to the rapid nature of the project, the database searches were designed to balance the need to

[1] Khouja C, Raine G, Harden M, Sutcliffe K, Sowden A (2024) Reviews on Long COVID: A scope of the literature. Update January 2024. 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.

retrieve as many relevant systematic reviews as possible against the limited time available for screening. The search strategies can be found in Appendix 1 (page 25).[4]

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 retrieved paper.

Key findings

From the database searches, 951 records were identified in total, and after duplicates were removed, 491 records were screened in EPPI-reviewer.[5] From PROSPERO, we screened 203 records. We included **36 published reviews, one protocol for a completed but not published review, and 62 protocols for ongoing reviews**. The flowchart of studies is shown in Appendix 2, page 32. Table 1 provides a summary of all reviews identified for this update by focus. The full reference and aim or research questions for each included review are provided on pages 8 to 14. Table 2 (Appendix 3, page 33) provides a summary of the reviews identified across all 10 reports we have produced to date.

Table 1: Summary of reviews (January to April 2024)

Review status Primary focus	Systematic review	Review of reviews	Living review	Review update	Evidence Map
Published reviews (n=36)					
Treatment or rehabilitation	2	1	1		1
Prevention	1				
Prevalence of symptoms or effects	20				1
Prevalence, and treatment	1				
Risk factors +/- prevalence	4	1			
Pathobiology or mechanisms	2				
Prevalence, treatment, and pathobiology		1			
Protocols - completed not published reviews (n=1)					
Treatment or rehabilitation	1				
Protocols - ongoing reviews (n=62)					
Treatment or rehabilitation	20				
Prevention	1		1	1	
Prevalence of symptoms or effects	24				
Risk factors +/- prevalence	8				
Risk factors +/- prevalence, and Prevention	2				
Pathobiology or mechanisms	4				
Health and social or economic effects	1				

[4] Due to resource limitations and speed of the review, we have not searched the Long COVID living map which may include further relevant systematic reviews.

[5] Thomas, J., Graziosi, S., Brunton, J., Ghouze, Z., O'Driscoll, P., Bond, M. & Koryakina, A. (2023) EPPI-Reviewer: advanced software for systematic reviews, maps and evidence synthesis. EPPI Centre, UCL Social Research Institute, University College London.

Published reviews

The number of systematic reviews identified for this update (n=36) was less than in the previous update in January (n=42), but similar to the same quarter last year, April 2023 (n=37); all three reports used the same databases and search strategy.

Treatment or rehabilitation (n=5)

Five reviews in the current update focused solely on treatment or rehabilitation. This was less than in the last two reports (January 2024 n=7 and October 2023 n=11), but the same as in the previous four reports (n=5). All five reviews were on rehabilitation. One was a review of reviews on exercise and breathing to treat Long COVID and to prevent or treat COVID-19 (#1 Carter, et al., 2023). One was a living review on rehabilitation for Long COVID and COVID-19 (#2 Arienti, et al., 2023). One was an evidence map on rehabilitation for neurological sequelae (#3 Felisbino, et al., 2024). The remaining two reviews were standard systematic reviews on pulmonary rehabilitation for Long COVID (#4 Martinez-Pozas, et al., 2024 and #5 Oliveira, et al., 2024).

Prevention (n=1)

One review focused solely on prevention, and it investigated vaccination to prevent Long COVID (#6 Man, et al., 2024). This was fewer than the number on prevention in the last report (n=3). Across all reports to date, there are now 10 published reviews that focus on vaccination to prevent Long COVID.

Prevalence of symptoms or effects (n=21)

The majority of published reviews (21/36) focused on the prevalence of symptoms or effects of Long COVID. One was an evidence map, comparing Long COVID with post-intensive care syndrome (#7 Soares, et al., 2023); the remaining 20 were standard systematic reviews. The number of reviews on prevalence (n=21) was similar to previous reports (e.g., January 2024 n=18).

Eight reviews investigated general symptoms of Long COVID. One was on adults and children (#8 Azzam, et al., 2024), and one was on adults only (#15 Franco, et al., 2024). One compared Long COVID with other post-viral conditions in children or young people (#21 Minotti, et al., 2024). One focused on the experiences of people with Long COVID (#18 Harrison, et al., 2024), one focused on functional recovery (#20 Middleton, et al., 2024), and one focused on the different symptoms and measures used for Long COVID (#27 Yang, et al., 2024). The remaining two reviews examined general symptoms in people with autoimmune rheumatic conditions (#12 Chen, et al., 2024) or in healthcare workers (#13 Cruickshank, et al., 2024).

The other 12 reviews focused on specific symptoms or groups of symptoms. One review focused on mental health in Long COVID patients, including anxiety, depression and sleep problems (#25 Seighali, et al., 2024). Four reviews focused on neurological or cognitive symptoms (#14 Fanshawe, et al., 2024, #16 Giussani, et al., 2024, #17 Gomes, et al., 2024, #26 Warnaerts, et al., 2024), one of which was on patients in South America (#17 Gomes, et al., 2024). Two reviews were on chest or lung symptoms, in adults (#9 Babar, et al., 2024) or in children (#10 Bakhtiari and Moazzen, 2024). The remaining reviews were on kidney and liver diseases (#22 Pan, et al., 2024); blood pressure (#11 Bielecka, et al., 2024); male sex hormones (#24 Puspaningrat, et al., 2024); irritable bowel syndrome (#19 Mathur, et al., 2024); or parkinsonism (#23 Polverino, et al., 2024), following COVID-19 infection.

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

One review investigated the prevalence of symptoms and the benefits of massage therapy (#28 Wheibe, et al., 2024).

Risk factors with or without prevalence of symptoms or effects (n=5)

Five reviews focused on risk factors for Long COVID, with or without symptom prevalence. This was fewer than in the last report (January 2024 n=9), but more than in the previous one (October 2023 n=1). One was a review of reviews on Long COVID risk factors and symptoms in children (#29 Heidar, et al., 2024). The other four reviews investigated social inequalities in symptoms (#31 Lammers, et al., 2024); smoking as a risk factor for Long COVID (#32 Trofor, et al., 2024); the risk factors and prevalence of pulmonary symptoms, alongside a cohort study (#30 Cornelissen, et al., 2024); and the risk factors and prevalence of brain fog and mental health conditions in Long COVID (#33 van der Feltz-Cornelis, et al., 2024).

Pathobiology or mechanisms (n=2)

Two reviews focused on the pathobiology or mechanisms of Long COVID; this number was the same as in the January 2024 report. In this update, one review focused on ribonucleic acid (RNA) in blood plasma, stool, urine, or nasal or oral swabs of patients with Long COVID (#34 Fernandez-de-Las-Penas, et al., 2024). The other was on brain alterations found on magnetic resonance neuroimaging (#35 Mohammadi and Ghaderi, 2024).

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

One review of reviews reported on the prevalence, treatment and pathobiology of multisystem inflammatory syndrome in children associated with COVID-19 (#36 Shioji, et al., 2024).

Protocols – completed not published reviews (n=1)

We identified one protocol for a completed review awaiting publication; it was on the efficacy of telerehabilitation compared with face-to-face pulmonary rehabilitation for Long COVID (#37 Sanchez Romero, et al., 2024).

Protocols - ongoing reviews (n=61)

We identified 61 protocols for ongoing reviews, which was more than in the January 2024 (n=41), October 2023 (n=41), and July 2023 (n=52) reports, but less than in April last year (n=68). As in previous reports, most of the protocols focused on the prevalence of symptoms or effects (n=24), or treatment or rehabilitation (n=20).

Treatment or rehabilitation (n=20)

Twenty protocols for ongoing reviews were on treatment or rehabilitation. This was more than in the previous two reports (January 2024 n=13 and October 2023 n=8), but fewer than in the two before those (July n=26 and April n=27, 2023).

Six protocols were on rehabilitation. Four were on exercise for Long COVID (#38 Abentroth and Alt, 2024; #49 Presta, et al., 2024; #51 Salvador-Ruiz, et al., 2024; and #56 Yin and Zhang, et al., 2024); one was on physical therapy (#57 Yin and Zhang, et al., 2024); and one was on rehabilitation for adults (#50 Rhodes and Douglas, 2024).

Seven protocols were on psychological or neurological treatments. One was on any psychological interventions (#42 Garriga Salvo, et al., 2024), one was on psychotherapy (#52 Schurr, et al., 2024), and one was on brain stimulation (#39 Ahmed and Mustafaoglu, 2024). The other four were on interventions or treatments for anxiety (#41 Cromwell Teo, et al., 2024), sleep disturbance (#43 Goh,

et al., 2024), brain fog (#44 Gorenshtein, et al., 2024), and cognitive impairments (#48 Ng, et al., 2024).

Three other protocols were on general treatments. One was on treatments for Long COVID in children and young people (#47 Luzinda, et al., 2024); one was on complementary therapies to improve quality of life (#53 Silva Junior, et al., 2024); and one was on the treatment and management of pulmonary complications (#54 Soril, et al., 2024).

The remaining four protocols were on specific treatments. These were on hyperbaric oxygen therapy (#55 Valeriano Zamora and Villca Zamora, 2024); photobiomodulation for anosmia and ageusia (#40 Araujo, et al., 2024); and acupuncture for fatigue (#45 Li and Yang, 2024); or for insomnia (#46 Li and Xia, 2024).

Prevention (n=3)

Three protocols focused on prevention; all were on vaccination (#58 Peine, et al., 2024; #59 Green, et al., 2024; and #60 Pillay, et al., 2024). One of the three protocols was for a living systematic review (#58 Peine, et al., 2024); and one was an update of a 2021 systematic review (#60 Pillay, et al., 2024). The number of protocols on prevention was similar to the previous three reports (all n=2).

Prevalence of symptoms or effects (n=24)

Twenty-four protocols were for reviews of the prevalence of symptoms or effects. This is more than in the January 2024 report (n=14), but similar to the October 2023 report (n=22).

Five of the 24 protocols were on a range of symptoms or any symptoms. Two were for reviews of any sequelae in sub-Saharan Africa (#78 Setegn and Tesema, 2024), or in the workplace (#83 Yew, et al., 2024). One was on health-related quality of life and health (#63 Basu, et al., 2024), and another was on quality of life in Long COVID vs chronic fatigue syndrome (#80 Weigel, et al., 2024). One protocol was on haematology versus respiratory complications (#65 Cardoso Leopoldo, et al., 2024).

Five protocols were on heart-related symptoms. Two were on cardiovascular disease (#62 Azhar and Jasmin, 2024; and #68 Huang, et al., 2024), and one was on the prevalence of cardiovascular complications after COVID-19, compared with their prevalence after influenza (#81 Wilmes and Janssen, 2024). One was on left cardiac function (#74 Mirzohreh, et al., 2024), and one was on myocardial perfusion (#79 Simpson, et al., 2024).

Four protocols were on brain-related symptoms or mental health. One was on neurological symptoms in female patients (#67 Gorenshtein, et al., 2024); one was on brain fog in Long COVID versus during or after chemotherapy (#82 Wilson, et al., 2024); one was on memory problems (#66 Costa, et al., 2024); and one was on depression, anxiety and post-traumatic stress disorder in adult women with Long COVID (#76 Reddy, et al., 2024).

Three protocols focused on children. Two were on multi-system inflammatory syndrome in children associated with COVID-19 (#64 Capuruco and Miranda, 2024; #77 Satapathy and Khatib, 2024), and one was on lung function in children (#73 Manduwa and Mbeye, 2024).

Three protocols were by the same author group; these were on rhinology (#70 Kulangara, et al., 2024), otology (#71 Kulangara, et al., 2024), and laryngology (#72 Kulangara, et al., 2024) symptoms. The remaining protocols were on lung function in adults (#69 Iversen, et al., 2024); post-exertion malaise (#61 An, et al., 2024); musculoskeletal symptoms (#75 Quazi and Shabil, 2024); or diabetes (#84 Zhou, et al., 2024), after COVID-19 infection.

Risk factors with or without prevalence of symptoms or effects (n=8)

Eight protocols were for reviews on risk factors with or without prevalence of symptoms for Long COVID. This was similar to the number of protocols in the previous two reports (January 2024 n=7, and October 2023 n=6).

Two protocols were on the prevalence and any risk factors for Long COVID in China (#89 Hu, et al., 2024) or in India (#91 Upadhyay and Shukla, 2024). Three were on the prevalence and risk factors for specific symptoms or groups of symptoms, which were depression, stress and suicide tendency (#85 Bidhendi-Yarandi, et al., 2024); renal artery thrombosis (#90 Paizante de Paula and de Mendonça Soares, 2024); and neurological symptoms (#86 Billah, et al., 2024), in Long COVID. The remaining three were on specific risk factors, which were psychological factors that affect distress in Long COVID (#87 Brown and Webb, 2024); COVID-19 severity as a predictor of Long COVID (#88 Guo, et al., 2024); and sleep disorders as risk factors for both COVID-19 and Long COVID (#92 Zhou and Li, 2024).

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

Two protocols by the same team of authors were on vaccination as prevention and the risk factors for brain fog (#93 Almeida, et al., 2024), or depressive disorder (#94 Almeida, et al., 2024).

Pathobiology or mechanisms (n=4)

Four protocols were on pathobiology or mechanisms of Long COVID. This is more than was in the last two reports (January 2024 n=1 and October 2023 n=0), but similar to the previous two (July n=3 and April n=4, 2023).

One was on muscle and brain metabolites in Long COVID, compared with in chronic fatigue syndrome or fibromyalgia (#98 Zambolin, et al., 2024). One was on neuroimaging, biomarkers, and structural and functional brain changes (#97 Wong and Lam, 2024). One was on the profile of autoantibodies (#95 Caze, et al., 2024); and the last one was on the role of thrombo-inflammatory markers (including VWF-ADAMTS-13) in Long COVID (#96 Rahmati, et al., 2024).

Social or economic effects (n=1)

One protocol was for a review on the impact of mental health issues in Long COVID on the workforce and healthcare services and costs (#99 Pillay, et al., 2024).

1) Published Reviews (n=36)

Treatment/rehabilitation (n=5)

Review of reviews

1. Carter T, O'Brien C, Akinbodye T, Lloyd I. The role of movement, exercise, and breathing in the prevention and treatment of COVID-19: an umbrella review. *CAND Journal* 2023;30:32-42. doi: https://dx.doi.org/10.54434/candj.163

Review aim: *To identify the published review literature regarding movement, exercise, and breathing in the prevention and/or treatment of the coronavirus 2019 disease (COVID-19) and Long COVID.*

NB The section on Long COVID focused on treatment only.

Living review

2. Arienti C, Lazzarini SG, Andrenelli E, et al. Rehabilitation and COVID-19: systematic review by Cochrane Rehabilitation. *European journal of physical & rehabilitation medicine* 2023;59:800-18. doi: https://dx.doi.org/10.23736/S1973-9087.23.08331-4

Review aim: *To identify the best available evidence on the effectiveness of interventions for rehabilitation for COVID-19-related limitations of functioning of rehabilitation interest in adults with COVID-19 or post COVID-19 condition (PCC).*

Evidence map

3. Felisbino J, Viegas Selma Maria da F, Machado Wiliam César A, et al. Rehabilitation in the day-to-day of people with post-COVID-19 neurological sequelae: scoping review. *Enferm glob* 2024;23:541-92. doi: https://dx.doi.org/10.6018/eglobal.571721

Review aim: *To map available scientific evidence on rehabilitation in the daily lives of people with post-COVID-19 neurological sequelae.*

Standard systematic reviews

4. Martinez-Pozas O, Melendez-Oliva E, Rolando LM, et al. The pulmonary rehabilitation effect on Long COVID-19 syndrome: a systematic review and meta-analysis. *Physiotherapy Research International* 2024;29:e2077. doi: https://dx.doi.org/10.1002/pri.2077

Review aim: *To evaluate the efficacy of pulmonary rehabilitation (PR) in improving dyspnea, fatigue, physical activity, quality of life, anxiety and depression in patients with Long COVID-19.*

5. Oliveira MR, Hoffman M, Jones AW, et al. Effect of pulmonary rehabilitation on exercise capacity, dyspnea, fatigue, and peripheral muscle strength in patients with post-COVID-19 syndrome: a systematic review and meta-analysis. *Archives of Physical Medicine & Rehabilitation* 2024;03:03. doi: https://dx.doi.org/10.1016/j.apmr.2024.01.007

Review aim: *To establish the effects of pulmonary rehabilitation in patients with persistent symptoms after COVID-19 infection; and compare modalities (face-to-face and telerehabilitation) and duration (4-8 weeks and >8 weeks).*

Prevention (n=1)

Standard systematic review

6. Man MA, Rosca D, Bratosin F, et al. Impact of pre-infection COVID-19 vaccination on the incidence and severity of post-COVID syndrome: a systematic review and meta-analysis. *Vaccines (Basel)* 2024;12:12. doi: https://dx.doi.org/10.3390/vaccines12020189

Review aim: *To critically evaluate the impact of a pre-infection COVID-19 vaccination on the incidence and severity of post-COVID-19 syndrome, and to assess the potential protective effect across different vaccines and patient demographics.*

Prevalence of symptoms and effects (n=21)

Evidence map

7. Soares C, Jéssika W, Cardoso de Melo BC, et al. Clinical relationships of post-COVID-19 syndrome with post-intensive care syndrome: a scope review. *Online Brazilian Journal of Nursing* 2023;22:1-9. doi: https://dx.doi.org/10.17665/1676-4285.20236632

Review aim: *To map the clinical relationships between post-COVID-19 syndrome and post-intensive care syndrome.*

Standard systematic reviews

8. Azzam A, Khaled H, Refaey N, et al. The burden of persistent symptoms after COVID-19 (Long COVID): a meta-analysis of controlled studies in children and adults. *Virology Journal* 2024;21:16. doi: https://dx.doi.org/10.1186/s12985-024-02284-3

Review aim: *To compare the burden of persistent symptoms among COVID-19 survivors relative to COVID-19-negative controls*.

9. Babar M, Jamil H, Mehta N, et al. Short- and long-term chest-CT findings after recovery from COVID-19: a systematic review and meta-analysis. *Diagnostics* 2024;14:14. doi: https://dx.doi.org/10.3390/diagnostics14060621

Review aim: *To evaluate chest computed tomography (CT) abnormalities stratified by COVID-19 disease severity and multiple timepoints post-infection.*

10. Bakhtiari E, Moazzen N. Pulmonary function in children post -SARS-CoV-2 infection: a systematic review and meta-analysis. *BMC Pediatrics* 2024;24:87. doi: https://dx.doi.org/10.1186/s12887-024-04560-1

Review aim: *To evaluate the respiratory symptoms and pulmonary function, in children, post-SARS-CoV-2 infection.*

11. Bielecka E, Sielatycki P, Pietraszko P, et al. Elevated arterial blood pressure as a delayed complication following COVID-19: a narrative review. *International Journal of Molecular Sciences* 2024;25:02. doi: https://dx.doi.org/10.3390/ijms25031837

Review aim: *To investigate the influence of COVID-19 infection on blood pressure elevation and the subsequent risk of developing arterial hypertension over an extended period.*

12. Chen DY, Huang PI, Tang KT. Characteristics of Long COVID in patients with autoimmune rheumatic diseases: a systematic review and meta-analysis. *Rheumatology Advances in Practice* 2024;8:rkae027. doi: https://dx.doi.org/10.1093/rap/rkae027

Review aim: *To summarise the characteristics of Long COVID in autoimmune rheumatic disease patients.*

13. Cruickshank M, Brazzelli M, Manson P, et al. What is the impact of long-term COVID-19 on workers in healthcare settings? A rapid systematic review of current evidence. *PLoS ONE* 2024;19:e0299743. doi: https://dx.doi.org/10.1371/journal.pone.0299743

Review aim: *To assess the effects of Long COVID among healthcare workers and its impact on health status, working lives, personal circumstances, and use of health service resources.*

14. Fanshawe JB, Sargent BF, Badenoch JB, et al. Cognitive domains affected post-COVID-19; a systematic review and meta-analysis. *European Journal of Neurology* 2024:e16181. doi: https://dx.doi.org/10.1111/ene.16181

Review aim: *To characterise the pattern of post-COVID-19 cognitive impairment, allowing better prediction of impact on daily function to inform clinical management and rehabilitation.*

15. Franco JVA, Garegnani LI, Metzendorf MI, et al. Post-COVID-19 conditions in adults: systematic review and meta-analysis of health outcomes in controlled studies. *BMJ Medicine* 2024;3:e000723. doi: https://dx.doi.org/10.1136/bmjmed-2023-000723

Review aim: *To synthesise available evidence from controlled cohort studies on the impact of SARS-CoV-2 infection in terms of post-COVID-19 conditions among adults considering their quality of life, functionality in daily activities, use of resources, recovery rates (cluster of symptoms), and the incidence of new medical diagnoses*.

16. Giussani G, Westenberg E, Garcia-Azorin D, et al. Prevalence and trajectories of post-COVID-19 neurological manifestations: a systematic-review and meta-analysis. *Neuroepidemiology* 2024;25:25. doi: https://dx.doi.org/10.1159/000536352

Review aim: *To evaluate the prevalence of thirteen neurological manifestations in people affected by COVID-19 during the acute phase and at 3, 6, 9 and 12-month follow-up time points.*

17. Gomes L, Martins CM, Pacheco EC, et al. Neurological and neuropsychiatric manifestations of post-COVID-19 condition in South America: a systematic review of the literature. *Arquivos de Neuro-Psiquiatria* 2024;82:1-8. doi: https://dx.doi.org/10.1055/s-0044-1779504

Review aim: *To determine the main neurological and neuropsychiatric manifestations after acute COVID-19 infection in South American countries.*

18. Harrison M, Rhodes T, Lancaster K. Constitution of Long COVID illness, patienthood and recovery: a critical synthesis of qualitative studies. *BMJ Open* 2024;14:e083340. doi: https://dx.doi.org/10.1136/bmjopen-2023-083340

Review aim: *To investigate the lived experiences of Long COVID.*

19. Mathur A, Shams U, Mishra P, et al. Post-infection irritable bowel syndrome following coronavirus disease-19: a systematic review and meta-analysis. *Indian Journal of Gastroenterology* 2024;23:23. doi: https://dx.doi.org/10.1007/s12664-023-01486-x

Review aim: *To evaluate the overall frequency of post-COVID-19 irritable bowel syndrome (IBS) and the relative risk of developing IBS among COVID-19 patients compared to healthy controls, using systematic review and meta-analysis techniques.*

20. Middleton S, Chalitsios CV, Mungale T, et al. Functional recovery of adults following acute COVID-19: a systematic review and meta-analysis. *Physical Therapy* 2024;22:22. doi: https://dx.doi.org/10.1093/ptj/pzae023

Review aim: *To investigate the objective functional recovery of patients more than three months after acute COVID-19 infection.*

21. Minotti C, McKenzie C, Dewandel I, et al. How does post-COVID differ from other post-viral conditions in childhood and adolescence (0-20 years old)? A systematic review. *EClinicalMedicine* 2024;68:102436. doi: https://dx.doi.org/10.1016/j.eclinm.2024.102436

Review aim: *To systematically describe studies on post-viral conditions and determine the entity of post-COVID compared to other post-viral conditions in children.*

22. Pan B, Wang X, Lai H, et al. Risk of kidney and liver diseases after COVID-19 infection: a systematic review and meta-analysis. *Reviews in Medical Virology* 2024;34:e2523. doi: https://dx.doi.org/10.1002/rmv.2523

Review aim: *To investigate whether COVID-19 exposure increases the long-term risk of kidney and liver disease, and what are the magnitudes of these associations.*

23. Polverino P, Cocco A, Albanese A. Post-COVID parkinsonism: a scoping review. *Parkinsonism & Related Disorders* 2024:106066. doi: https://dx.doi.org/10.1016/j.parkreldis.2024.106066

Review aim: *To provide a more detailed understanding of parkinsonism reported to occur following SARS-CoV-2 infection.*

24. Puspaningrat AAP, Hakim L, Renaldo J. Effect of SARS-CoV-2 viral infection on male sexual hormones levels post COVID-19 exposure: a systematic review and meta-analysis. *Archivio Italiano di Urologia, Andrologia* 2024:12113. doi: https://dx.doi.org/10.4081/aiua.2024.12113

Review aim: *To investigate the effects of SARS-CoV-2 virus infection on male sexual hormonal abnormalities in patients after exposure to COVID-19.*

25. Seighali N, Abdollahi A, Shafiee A, et al. The global prevalence of depression, anxiety, and sleep disorder among patients coping with post COVID-19 syndrome (Long COVID): a systematic review and meta-analysis. *BMC Psychiatry* 2024;24:105. doi: https://dx.doi.org/10.1186/s12888-023-05481-6

Review aim: *To investigate the incidence of mental disorders among patients experiencing post-COVID-19 syndrome.*

26. Warnaerts N, Beeckmans K, Morrens M, De Picker L. [Impairments in neurocognitive functions in patients with Long COVID: a systematic review]. *Tijdschrift voor Psychiatrie* 2024;66:12-18.

Review aim: *To map the specific neurocognitive profile and determine the prevalence of impairment in at least one cognitive domain in patients with Long COVID.*

27. Yang J, Markus K, Andersen KM, et al. Definition and measurement of post-COVID-19 conditions in real-world practice: a global systematic literature review. *BMJ Open* 2024;14:e077886. doi: https://dx.doi.org/10.1136/bmjopen-2023-077886

Review aim: *To summarise the heterogeneous methodology used to measure post-COVID conditions across real-world studies and highlight trends by region, age group, follow-up period and data source.*

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

Standard systematic review

28. Wheibe E, Dalkin BH, Meltzer HC, et al. The multisystem effects of Long COVID syndrome and potential benefits of massage therapy in Long COVID care. *International Journal of Therapeutic Massage & Bodywork* 2024;17:19-42. doi: https://dx.doi.org/10.3822/ijtmb.v17i1.767

Review aim: *To characterise the reported symptoms of Long COVID Syndrome to pinpoint predominant symptoms and affected organ systems; and to examine massage therapy as a model system for Long COVID treatment, based on documented uses of various massage therapy techniques.*

Risk factors with or without prevalence of symptoms or effects (n=5)

Review of reviews

29. Heidar A, Nurchis MC, Garlasco J, et al. Pediatric post COVID-19 condition: an umbrella review of the most common symptoms and associated factors. *European journal of public health* 2024 doi: https://dx.doi.org/10.1093/eurpub/ckae033

Review aim: To investigate the most common symptoms and predictors or risk factors for pediatric *post-COVID condition.*

Standard systematic reviews

30. Cornelissen MEB, Leliveld A, Baalbaki N, et al. Pulmonary function 3-6 months after acute COVID-19: a systematic review and multicentre cohort study. *Heliyon* 2024;10:e27964. doi: https://dx.doi.org/10.1016/j.heliyon.2024.e27964

Review aim: *To describe pulmonary function 3-6 months following acute COVID-19, to evaluate potential predictors of decreased pulmonary function and to review literature for the effect of COVID-19 on pulmonary function.*

31. Lammers N, Beese F, Hoebel J, et al. Social inequalities in long-term health effects after COVID-19-a scoping review. *International Journal of Public Health* 2024;69:1606739. doi: https://dx.doi.org/10.3389/ijph.2024.1606739

Review aim: *To map and synthesise evidence about social inequalities in long-term health effects after COVID-19, often referred to as "Long COVID" or "post-COVID-19 conditions".*

32. Trofor AC, Robu P, Melinte OE, et al. Looking at the data on smoking and post-COVID-19 syndrome: a literature review. *Journal of Personalized Medicine* 2024;14:16. doi: https://dx.doi.org/10.3390/jpm14010097

Review aim: *To review relevant work addressing the interaction between smoking and Long COVID in order to characterise smoking's role as a risk factor and possibly identify new research directions.*

33. van der Feltz-Cornelis C, Turk F, Sweetman J, et al. Prevalence of mental health conditions and brain fog in people with Long COVID: a systematic review and meta-analysis. *General Hospital Psychiatry* 2024;88:10-22. doi: https://dx.doi.org/10.1016/j.genhosppsych.2024.02.009

Review aim: *To estimate the prevalence and explore relevant factors associated with the incidence of impaired cognition (brain fog) and mental health conditions.*

Pathobiology or mechanisms (n=2)

Standard systematic reviews

34. Fernandez-de-Las-Penas C, Torres-Macho J, Macasaet R, et al. Presence of SARS-CoV-2 RNA in COVID-19 survivors with post-COVID symptoms: a systematic review of the literature. *Clinical Chemistry & Laboratory Medicine* 2024;19:19. doi: https://dx.doi.org/10.1515/cclm-2024-0036

Review aim: *To investigate the presence of SARS-CoV-2 RNA in plasma, stool, urine, and nasal/oral swab samples in individuals with post-COVID symptoms.*

35. Mohammadi S, Ghaderi S. Post-COVID-19 conditions: a systematic review on advanced magnetic resonance neuroimaging findings. *Neurological Sciences* 2024;29:29. doi: https://dx.doi.org/10.1007/s10072-024-07427-6

Review aim: *To synthesise findings from studies that used advanced MRI, to characterise possible COVID-19-induced brain alterations, in individuals with post-COVID conditions.*

Prevalence of symptoms or effects; treatment or rehabilitation; and pathobiology or mechanisms (n=1)

Review of reviews

36. Shioji N, Sumie M, Englesakis M, et al. Multisystem inflammatory syndrome in children: an umbrella review. *Journal of anesthesia* 2024 doi: https://dx.doi.org/10.1007/s00540-024-03323-7

Review aim: *To evaluate which patient features have been investigated in the multi-system inflammatory syndrome in children (MIS-C) population, in order to guide future investigations.*

2) Protocols for completed but not published reviews related to Long COVID (n=1)

Treatment or rehabilitation (n=1)

Standard systematic review

37. Sánchez Romero, et al. Efficacy of telerehabilitation vs. face-to-face pulmonary rehabilitation in patients with long-COVID-19: a systematic review and network meta-analysis. PROSPERO 2024 CRD42024504916 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024504916

Review question: What are the differences between face-to-face pulmonary rehabilitation and telerehabilitation in terms of quality of life and improvements in physical function in patients with Long-COVID-19?

3) Protocols for ongoing reviews related to Long COVID (n=61)

Treatment or rehabilitation (n=20)

Standard systematic reviews

38. Abentroth and Alt. Effects of physical exercise on quality of life and mental health in Post-Acute COVID-19 Syndrome. PROSPERO 2024 CRD42024492543 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024492543

Review question: What are the effects of physical exercise on the quality of life and mental health of individuals post-COVID?

39. Ahmed and Mustafaoglu. Transcranial direct current stimulation for post-COVID: a systematic review with meta-analysis of randomized controlled trial. PROSPERO 2024 CRD42024522297 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024522297

Review question: Does transcranial direct current stimulation improve post-COVID-19 symptoms?

40. Araujo, et al. Photobiomodulation for the treatment of post-COVID-19 anosmia and ageusia: a systematic review. PROSPERO 2024 CRD42024503264 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024503264

Review question: Is photobiomodulation effective in recovering COVID-19 anosmia and ageusia?

41. Cromwell Teo, et al. Investigating interventions for anxiety in Long COVID patients: a systematic review with meta-analysis of randomized controlled trials. PROSPERO 2024 CRD42024517569 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024517569

Review question: How effective are current interventions in alleviating anxiety in Long COVID patients?

42. Garriga Salvó, et al. Are psychological interventions effective in Long COVID? Protocol for a systematic review and meta-analysis. PROSPERO 2024 CRD42024528554 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024528554

Review question: What is the effectiveness of the psychological-based interventions to reduce Long COVID symptoms and improve well-being and quality of life in individuals with Long COVID?

43. Goh, et al. Effect of interventions for the management of Sleep Disturbance in patients with Long-COVID: a systematic review and meta-analysis of randomized controlled trials. PROSPERO 2024 CRD42024524409 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024524409

Review question: How do the available pharmacological and non-pharmacological interventions impact the severity of sleep disturbance in patients with Long COVID?

44. Gorenshtein, et al. Systematic review of brain fog caused by post COVID-19 treatment modalities. PROSPERO 2024 CRD42024502977 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024502977

Review question: In adults with post-acute sequelae of COVID-19 with brain-fog symptoms, what are the treatments available and how effective are they?

45. Li and Yang. Effects of acupuncture for post-COVID-19 fatigue: a protocol for systematic review and meta-analysis. PROSPERO 2024 CRD42024503978 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024503978

Review question: Is acupuncture effective in relieving post-COVID-19 fatigue?

46. Li and Xia. Efficacy and safety of acupuncture for post-COVID-19 insomnia: a protocol for systematic review and meta-analysis. PROSPERO 2024 CRD42024503181 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024503181

Review question: What is the role of acupuncture in post-COVID-19 insomnia?

47. Luzinda, et al. Novel treatments for long COVID in children and young people: a systematic review of the literature. PROSPERO 2024 CRD42024508527 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024508527

Review question: Are novel treatments for Long COVID effective in reducing symptoms in children and young people aged 0-24 years?

48. Ng, et al. Effectiveness of pharmacological and non-pharmacological treatments targeting cognitive impairment in patients with long-COVID. PROSPERO 2024 CRD42024522168 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024522168

Review question: What is the efficacy of the current pharmacological and non-pharmacological treatments targeting cognitive impairment in Long COVID patients?

49. Presta, et al. Post-acute COVID-19 syndrome (PACS) and exercise interventions: a systematic review of randomized controlled trials. PROSPERO 2024 CRD42024517069 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024517069

Review question: Is there scientific evidence concerning the effectiveness of exercise interventions in post-acute COVID-19 syndrome?

50. Rhodes and Douglas. What is the current evidence-based practice for the rehabilitation of adults with long COVID in primary care? A systematic review. PROSPERO 2024 CRD42024502484 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024502484

Review questions: What is the current evidence-based practice for the rehabilitation of adults with Long COVID in primary care? What types of rehabilitation improve quality of life in those with Long COVID? What types of rehabilitation improve functional outcomes, or reduce the burden of symptoms, for adults with Long COVID?

51. Salvador-Ruiz, et al. Effects of physical exercise in people with post-acute COVID-19 syndrome: a systematic review and meta-analysis of randomized control trials. PROSPERO 2024 CRD42024511124 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024511124

Review question: What are the health effects of physical exercise intervention compared to another conventional rehabilitation treatment in post-acute COVID-19 syndrome patients?

52. Schurr, et al. Psychotherapy in patients with Long/post-COVID: a systematic review on the feasibility, acceptability and efficacy of emerging and available interventions. PROSPERO 2024 CRD42024502414 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024502414

Review questions: What psychotherapeutic interventions are currently being researched or have been developed and/or studied to address people suffering from long/post-COVID symptoms? What is known about the acceptability, feasibility and efficacy of these interventions?

53. Silva Junior, et al. Impact of complementary therapies on the quality of life of people suffering from post-acute covid-19 syndrome. PROSPERO 2024 CRD42024504080 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024504080

Review question: Is there an impact on the quality of life scores of adults with signs and symptoms of Long COVID after participating in complementary therapies?

54. Soril, et al. Rapid review of treatments and recommendations for the workup and management of post-COVID-19 pulmonary complications. PROSPERO 2024 CRD42024471757 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024471757

Review question: What are the expert recommendations or guidelines for the workup and/or management of pulmonary complications of post-COVID-19 including: organising pneumonia, fibrotic changes, pulmonary embolism, exercise limitation and or desaturation, viral hyperactivity, persistent dyspnoea (associated with post-COVID condition), persistent cough with or without sputum (associated with post-COVID condition), and persistent non-cardiac chest pain (associated with post-COVID condition)? What is the existing observational, case control/series or randomised controlled trial (RCT) evidence for medical interventions on any of the above complications? What is the existing observational, case control/series or RCT evidence for rehabilitation interventions on any of the above complications?

55. Valeriano Zamora and Villca Zamora. Hyperbaric oxygen treatment for Long-COVID syndrome: a systematic review of current evidence. PROSPERO 2024 CRD42024530421 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024530421

Review question: What is the efficacy of Hyperbaric oxygen treatment for Long-COVID syndrome?

56. Yin and Zhang. Effectiveness of exercise therapy in rehabilitation of patients with Long COVID: a systematic review and meta-analysis. PROSPERO 2024 CRD42024508828 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024508828

Review question: What is the effectiveness of exercise therapy for the Long COVID population?

57. Yin and Zhang. Effectiveness of physical therapy in rehabilitation of patients with Long COVID: a systematic review and meta-analysis. PROSPERO 2024 CRD42024506208 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024506208

Review question: What is the effectiveness of physical therapy for Long COVID?

Prevention (n=3)

Living review

58. Peine, et al. Efficacy and effectiveness of COVID-19 vaccines against post-COVID condition: a living systematic review. PROSPERO 2024 CRD42024503890 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024503890

Review question: Are vaccines against COVID-19, administered before SARS-CoV-2 infection, effective to prevent post-COVID condition?

Standard systematic reviews

59. Green, et al. A systematic review of the impact of vaccination (and boosters) on Long COVID in the Omicron era. PROSPERO 2024 CRD42024501445 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024501445

Review question: What is the impact of COVID-19 vaccination and COVID-19 boosters on Long COVID caused by Omicron infections?

60. Pillay, et al. Preventive interventions for post-COVID-19 condition: protocol for systematic review update. PROSPERO 2024 CRD42024513247 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024513247

Review question: Among people in the acute (symptom onset to 4 weeks) or early post-acute phase (4-8 weeks) of COVID-19, what are the effects of interventions to prevent post-COVID-19 condition?

NB This is an update of a 2021 review.

Prevalence of symptoms or effects (n=24)

Standard systematic reviews

61. An, et al. Prevalence and measurement of post-exertional malaise (PEM) in post-acute COVID-19 syndrome: a systematic review and meta-analysis. PROSPERO 2024 CRD42024466794 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024466794

Review questions: What is the prevalence of post-exertional malaise following COVID-19 infection? What kinds of testing have been utilized to measure post-exertional malaise in post COVID-19 syndrome?

62. Azhar and Jasmin. Outcome of cardiovascular magnetic resonance imaging (CMR) in recovered COVID-19 patients that developed cardiac disease: a systematic review. PROSPERO 2024 CRD42024477067 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024477067

Review questions: 1. What are the types of cardiovascular diseases and long-term effects detected by CMR in recovered COVID-19 patients? 2. What are the parameters used in CMR to detect the cardiac abnormalities and long-term effects in recovered COVID-19 patients? 3. How does COVID-19 cause the development of cardiac disease and long-term cardiovascular effects in recovered COVID-19 patients?

63. Basu, et al. Health-related quality of life (HRQoL) and long-term health outcomes among COVID-19 infected patients in India: a systematic review. PROSPERO 2024 CRD42024511990 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024511990

Review question: What are the HRQoL and long-term health outcomes of COVID-19-infected patients in India?

64. Capuruco and Miranda. COVID-19 and multisystem inflammatory syndrome in children: a systematic review. PROSPERO 2024 CRD42024511662 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024511662

Review question: What are the cardiac change and echocardiography and cardiac magnetic resonance change (left ventricular disfunction, pericardial effusion, pericarditis, and coronary abnormalities) outcomes and follow-up (medium and long-term) of patients with multisystem inflammatory syndrome in children associated with COVID-19?

65. Cardoso Leopoldo, et al. Are the main complications of COVID-19 hematological or respiratory? A systematic review. PROSPERO 2024 CRD42024474396 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024474396

Review question: What are the main complications in post-COVID-19 patients, respiratory or haematological?

66. Costa, et al. Memory and COVID, what do we know? PROSPERO 2024 CRD42024519297 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024519297

Review questions: 1. Is memory loss a relevant part of the spectrum of post-COVID syndrome? 2. Does the COVID-19 infection affect the quality of memory? 3. Is there enough research to determine the persistence of post-COVID-19 memory loss? 4. Does post-COVID-19 memory loss impact individuals' daily activities and life quality?

67. Gorenshtein, et al. A systematic review of neurological symptoms due post-acute sequelae COVID-19 in female population group. PROSPERO 2024 CRD42024512266 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024512266

Review questions: What is the estimated prevalence of neurological symptoms in the Long COVID female population? Is the prevalence in the female population higher than in the general population? What are the most common neurological symptoms (caused by the post-acute sequelae of COVID-19) in the female population?

68. Huang, et al. Burgeoning or deteriorative cardiovascular disease in post-acute COVID-19 syndrome: a meta-analysis. PROSPERO 2024 CRD42024524290 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024524290

Review question: Are there statistical differences in the probability of new or worsening cardiovascular disease between healthy and long haul COVID-19 infected people?

69. Iversen, et al. Long-term impact of COVID-19 on lung function: a systematic review and meta-analysis of hospitalized and non-hospitalized individuals beyond one year. PROSPERO 2024 CRD42024499288 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024499288

Review question: How does COVID-19 impact lung function at the time of infection compared to one year or more after infection in hospitalised and non-hospitalised patients?

70. Kulangara, et al. Rhinology complications in COVID-19: a systematic review and meta-analysis. PROSPERO 2024 CRD42024522348 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024522348

Review question: In adults previously infected with COVID-19, what is the prevalence of rhinology complications, including anosmia, septal abscess, epistaxis, mucormycosis, changes in smell/olfaction, migraine, headaches, facial pain/pressure, phantosmia, parosmia, hyposmia, and fatigue?

71. Kulangara, et al. Otology complications in COVID-19: a systematic review and meta-analysis. PROSPERO 2024 CRD42024516774 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024516774

Review questions: In adults previously infected with COVID-19, how prevalent are otologic complications including hearing loss, tinnitus, vertigo, vestibular neuritis, and sudden sensorineural hearing loss, and what are the underlying mechanisms?

72. Kulangara, et al. Laryngology complications in COVID-19: a systematic review and meta-analysis. PROSPERO 2024 CRD42024522344 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024522344

Review question: In adults previously infected with COVID-19, what is the prevalence of laryngologic complications, including sore throat, cough, dysgeusia, dysphagia, odynophagia, supraglottitis, epiglottitis, shortness of breath, dysphonia, laryngeal stenosis, and tracheal stenosis?

73. Manduwa and Mbeye. Long term effects of COVID 19 on the pulmonary function of children and adolescents. PROSPERO 2024 CRD42024521602 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024521602

Review question: Does SARS-CoV-2 infection (COVID 19) have an impact on the pulmonary function of children and adolescents as compared to adults?

74. Mirzohreh, et al. Left cardiac function in patients after COVID-19. PROSPERO 2024 CRD42024481337 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024481337

Review question: Does COVID-19 affect left cardiac function in COVID-19 survivors?

75. Quazi and Shabil. Musculoskeletal manifestations of postacute sequelae of SARS-CoV-2 infection: a systematic review and meta-analysis. PROSPERO 2024 CRD42024509080 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024509080

Review question: What are the prevalence and characteristics of musculoskeletal manifestations in individuals experiencing post-acute sequelae of SARS-CoV-2 infection (PASC)?

76. Reddy, et al. Prevalence of depression, anxiety and post-traumatic stress disorder in women with Long COVID: a systematic review and meta-analysis. PROSPERO 2024 CRD42024489717 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024489717

Review question: What is the prevalence of depression, anxiety and post-traumatic stress disorder in women ≥ 18 years of age with Long COVID?

77. Satapathy and Khatib. Clinical manifestation of multisystem inflammatory syndrome in children associated with COVID-19: a systematic review with meta-analysis. PROSPERO 2024 CRD42024520198 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024520198

Review questions: 1. What is the risk of shock among COVID-19-associated multisystem inflammatory syndrome in children (MIS-C)? 2. Are acute kidney injury and/or myocarditis associated with higher risk of developing shock? 3. Does NT-pro-BNP levels provide better prediction and monitoring of the multisystem inflammatory syndrome prognosis? 4. What is the risk of mortality among COVID-19-associated MIS-C? 5. What is the risk of cardiac dysfunction among COVID-19-associated MIS-C? 6. What is the risk of acute kidney injury among COVID-19 associated MIS-C? 7. What is the incidence of MIS-C without exposure to SARS-CoV-2 infection?

78. Setegn and Tesema. Long health sequalae of COVID-19 pandemic in sub-Saharan Africa: systematic review and meta-analysis. PROSPERO 2024 CRD42024501158 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024501158

Review question: What are the Long COVID signs and symptoms in sub-Saharan Africa?

79. Simpson, et al. Myocardial perfusion in post-COVID-19 syndromes: a systematic review. PROSPERO 2024 CRD42024508894 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024508894

Review question: What current evidence is there regarding the utilisation of myocardial perfusion assessment following COVID-19?

80. Weigel, et al. Health-related quality of life in myalgic encephalomyelitis/chronic fatigue syndrome and post-COVID-19 condition: a systematic review. PROSPERO 2024 CRD42024501309 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024501309

Review questions: How is health-related quality of life (HRQoL) impacted among people with myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) and post-COVID-19 condition? Do people with ME/CFS and post-COVID-19 condition experience the same impairments in HRQoL? In which domains of HRQoL do people with ME/CFS and post COVID-19 condition experience impairments when compared with healthy people? How do the impairments in HRQoL among people with ME/CFS and post COVID-19 condition compare with those among people from other chronic illness cohorts?

81. Wilmes and Janssen. Long-term cardiovascular adverse events after a SARS-CoV-2 or influenza infection: a systematic review and meta-analysis. PROSPERO 2024 CRD42024510026 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024510026

Review question: What is the incidence of cardiovascular adverse events during infection, in the short-term (≤6 six months) and long-term (>6 months) in adults with a (history of) suspected or confirmed SARS-CoV-2 infection, compared with the incidence in individuals with a (history of) influenza?

82. Wilson, et al. Cognitive, functional, and affective characteristics of brain fog in Long COVID and chemotherapy patients: systematic review. PROSPERO 2024 CRD42024520549 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024520549

Review questions: What are the cognitive, functional, and affective characteristics of brain fog in Long COVID and chemotherapy patients? What tests/tools are used to quantify these characteristics? How do these two groups (i.e. Long COVID and chemotherapy populations) differ?

NB Long COVID will be a section of this review.

83. Yew, et al. Prevalence and symptoms of Long COVID-19 in the workplace: a systematic review and meta-analysis. PROSPERO 2024 CRD42024499679 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024499679

Review questions: What is the prevalence of Long COVID-19 in the workplace? What are the symptoms of Long COVID-19 in the workplace?

84. Zhou, et al. COVID-19, Long COVID-19 and risk of diabetes: a meta-analysis. PROSPERO 2024 CRD42024522050 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024522050

Review question: Compared with healthy people, do patients with Long COVID or after COVID have a higher risk of being diagnosed with any types of new onset diabetes?

Risk factors with or without prevalence of symptoms or effects (n=8)

Standard systematic reviews

85. Bidhendi-Yarandi R, et al. Prevalence of depression, stress and suicide tendency among individuals with Long COVID and determinants: a protocol of a systematic review and meta-analysis. BMJ Open 2024;14:e075754. http://dx.doi.org/10.1136/bmjopen-2023-075754

Review questions: What is the prevalence of depression, stress and suicide tendencies among individuals with Long COVID? Which factors contribute to these conditions?

86. Billah, et al. Post-COVID neurological syndrome: a systematic review. PROSPERO 2024 CRD42024519562 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024519562

Review questions: What are the characteristic features of post-COVID neurology syndrome? What are the clinical manifestations associated with post-COVID neurology syndrome? What are the risk factors contributing to the development of post-COVID neurology syndrome? What are the characteristic complications or disorders associated with post-COVID neurology syndrome?

87. Brown and Webb. Psychological factors that impact distress in Long COVID. PROSPERO 2024 CRD42024496297 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024496297

Review question: What are the psychological factors impacting on the relationship between distress and Long COVID?

88. Guo, et al. Association between the prevalence of post-acute sequelae of COVID-19 and the disease severity of the acute infection of SARS-CoV-2: a systematic review and meta-analysis. PROSPERO 2024 CRD42024515802 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024515802

Review questions: Is the prevalence of post-acute sequelae of COVID-19 related to the disease severity of the acute infection of SARS-CoV-2? What is the correlation between the prevalence of post-acute sequelae of COVID-19 and the severity of the acute infection of SARS-CoV-2?

89. Hu, et al. Prevalence and risk factors for Long COVID in China: a systematic review and meta-analysis. PROSPERO 2024 CRD42024519375 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024519375

Review questions: What is the prevalence of Long COVID in China and what are the risk factors?

90. Paizante de Paula and de Mendonça Soares. Renal artery thrombosis associated with COVID-19: a systematic review. PROSPERO 2024 CRD42024511370 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024511370

Review questions: What is the profile of patients treated for renal artery thrombosis associated with SARS CoV-2 infection? What are the clinical manifestations and changes in the examinations of the reported cases? Do patients have any comorbidity and/or associated risk factors? Which therapeutic and prophylactic methods were used in the reported cases?

91. Upadhyay and Shukla. Risk factors and emotional health consequences of post-COVID-19 syndrome in India: a systematic review. PROSPERO 2024 CRD42024500014 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024500014

Review questions: Is the risk of developing post-COVID-19 syndrome in India dependent on/aggravated by the presence of certain factors? What are the major emotional health complications appearing as a result of post-COVID-19 syndrome in India?

92. Zhou and Li. Pre-existing sleep disorders and risk of COVID-19. PROSPERO 2024 CRD42024503518 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024503518

Review questions: What is the association between pre-existing sleep disorders and COVID-19, including susceptibility, hospitalization, intensive care unit (ICU) admission, mortality, and Long COVID? What are the effects of specific pre-existing sleep disorders on five outcomes, and the potential associated factors?

NB Long COVID will be a section of this review.

Risk factors with or without prevalence of symptoms or effects and Prevention (n=2)

Standard systematic reviews

93. Almeida, et al. Brain fog in Long COVID and the relationship with vaccination: a systematic review. PROSPERO 2024 CRD42024526942 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024526942

Review question: What are the incidence and risk factors for Brain Fog in Long COVID, and the relationship with vaccination?

94. Almeida, et al. Depressive disorder in Long COVID and the relationship with vaccination: a systematic review. PROSPERO 2024 CRD42024526922 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024526922

Review question: What are the incidence and risk factors for depressive disorder in Long COVID, and the relationship with vaccination?

Pathobiology or mechanisms (n=4)

Standard systematic review

95. Caze, et al. Prevalence and profile of autoantibodies in Long COVID. PROSPERO 2024 CRD42024502181 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024502181

Review questions: What is the frequency of autoantibodies in patients with Long COVID? What is the autoantibodies profile in patients with Long COVID?

96. Rahmati, et al. The role of the VWF-ADAMTS-13 axis, complement system, and other thrombo-inflammatory markers in Long COVID: a systematic review and meta-analysis. PROSPERO 2024 CRD42024521306 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024521306

Review question: Is thrombo-inflammation a long-term sequela of SARS-CoV-2 infection?

97. Wong and Lam. Neuroimaging findings for identifying potential biomarkers, structural changes, and functional alterations in brain of Long COVID patients: a systematic review. PROSPERO 2024 CRD42024510019 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024510019

Review question: In Long COVID survivors, what is the current state of evidence regarding the neuroimaging findings (compared to healthy controls) in terms of identifying potential biomarkers, structural changes, and functional alterations?

98. Zambolin, et al. Muscle and brain metabolism in fibromyalgia, chronic fatigue syndrome and Long COVID: a systematic review and meta-analysis. PROSPERO 2024 CRD42024501517 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024501517

Review questions: Do fibromyalgia, chronic fatigue syndrome and Long COVID patients show different muscle and brain metabolites production compared with healthy control participants? Do differences in brain and muscle metabolites link with the self-reported level of pain and fatigue or conditions' severity scores? Do quantitative metabolite responses tell us anything about any pathophysiological predominant factors?

Social or economic effects (n=1)

Standard systematic review

99. Pillay, et al. Impacts on labour force and healthcare services related to mental-health issues following an acute SARS-CoV-2 infection: rapid review. PROSPERO 2024 CRD42024504369 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024504369

Review question: What are the impacts on the (a) labour force and (b) healthcare services and costs related to mental-health issues following an acute SARS-CoV-2 infection?

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 April 02, 2024

Date searched: 3rd April 2024

Records retrieved: 349

1 Post-Acute COVID-19 Syndrome/ (3211)
2 COVID-19 post-intensive care syndrome.mp. (6)
3 COVID-19/ or SARS-CoV-2/ (264779)
4 Syndrome/ (123822)
5 Survivors/ (31408)
6 4 or 5 (155106)
7 3 and 6 (1119)
8 1 or 2 or 7 (4240)
9 ((long adj (covid$ or covid-19 or covid19 or coronavirus)) or longcovid$).ti,ab,kf,ot,bt. (5098)
10 ((post adj (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) or postcovid$).ti,ab,kf,ot,bt. (10552)
11 ((post acute or postacute) adj2 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (1046)
12 PASC.ti,ab,kf,ot,bt. (936)
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. (2946)
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. (354)
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. (2442)
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. (4490)
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. (143)
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. (271)
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. (3259)
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. (10038)
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. (3126)
22 or/9-21 (32392)
23 8 or 22 (32893)
24 systematic review.mp,pt. (340131)
25 search:.tw. (689907)
26 meta analysis.mp,pt. (302334)
27 review.pt. (3302042)
28 24 or 25 or 26 or 27 (3854040)
29 23 and 28 (5315)

30 qualitative review$.ti,ab,kf,ot,bt. (1863)
31 realist synthes$.ti,ab,kf,ot,bt. (435)
32 realist review$.ti,ab,kf,ot,bt. (741)
33 (meta-synthes$ or metasynthes$).ti,ab,kf,ot,bt. (2310)
34 (living adj2 (review$ or map$)).ti,ab,kf,ot,bt. (799)
35 pooled analysis.ti,ab,kf,ot,bt. (13433)
36 or/30-35 (19379)
37 23 and 36 (73)
38 29 or 37 (5323)
39 (202401$ or 202402$ or 202403$ or 202404$).dt. (420434)
40 38 and 39 (349)
41 exp animals/ not humans.sh. (5208746)
42 40 not 41 (349)
43 preprint.pt. (21924)
44 42 not 43 (349)

CINAHL Plus
via Ebsco https://www.ebsco.com/
Date range: Inception to 20240403
Date searched: 3rd April 2024
Records retrieved: 252

S1	(MH "Post-Acute COVID-19 Syndrome")	1,274
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*)	1,570
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*)	1,768
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))	381
S5	TI PASC OR AB PASC	112
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))	616
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))	283
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 ((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))	1,111
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))	982

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))	51
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))	90
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))	1,109
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))	4,480
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))	927
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	11,092
S16	(MH "Systematic Review")	134,023
S17	(ZT "systematic review")	159,030
S18	(ZT "meta analysis")	57,863
S19	(MH "Meta Analysis")	73,955
S20	TI (meta-analys* or metaanaly*) OR AB (meta-analys* or metaanaly*)	115,368
S21	TI systematic* N1 review* OR AB systematic* N1 review*	163,086
S22	S16 OR S17 OR S18 OR S19 OR S20 OR S21	271,106
S23	(ZT "review")	382,553
S24	AB systematic* or AB methodologic* or AB quantitative* or AB research* or AB literature* or AB studies or AB trial* or AB effective*	2,871,146
S25	(S23 AND S24)	171,682
S26	S22 OR S25	433,793
S27	S15 AND S26	687
S28	(MH "Meta Synthesis")	2,298
S29	TI qualitative N1 review* OR AB qualitative N1 review*	4,105
S30	TI (realist N1 (review* or synthes*)) OR AB (realist N1 (review* or synthes*))	600
S31	TI (meta-synthes* or metasynthes*) OR AB (meta-synthes* or metasynthes*)	1,932
S32	TI (living N2 (review* or map*)) AND (living N2 (review* or map*))	236
S33	TI pooled N1 analys* OR AB pooled N1 analys*	8,520
S34	S28 OR S29 OR S30 OR S31 OR S32 OR S33	16,026
S35	S15 AND S34	31
S36	S27 OR S35	698

S37	EM 202312-	84,006
S38	(ZD "in process")	1,700,152
S39	S37 OR S38	1,784,158
S40	S36 AND S39	252

Cochrane Database of Systematic Reviews (CDSR)
via Wiley http://onlinelibrary.wiley.com/
Issue: Issue 4 of 12, April 2024
Date searched: 3rd April 2024
Records retrieved: 2

ID	Search	Hits
#1	MeSH descriptor: [Post-Acute COVID-19 Syndrome] this term only	207
#2	MeSH descriptor: [COVID-19] this term only	7576
#3	MeSH descriptor: [SARS-CoV-2] this term only	3155
#4	MeSH descriptor: [Syndrome] this term only	6553
#5	MeSH descriptor: [Survivors] this term only	1794
#6	#2 or #3	7835
#7	#4 or #5	8342
#8	#6 and #7	101
#9	#1 or #8	288
#10	(long next (covid* or covid-19 or covid19 or coronavirus) or longcovid*):ti,ab,kw	423
#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,kw	753
#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,kw	1379
#13	PASC:ti,ab,kw	64
#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,kw	165
#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,kw	38
#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,kw	809
#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,kw	273
#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,kw	1370
#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,kw	626
#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,kw	200
#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,kw	323
#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,kw	187
#23	{OR #10-#22}	2770
#24	#9 or #23 with Cochrane Library publication date Between Jan 2024 and Apr 2024, in Cochrane Reviews, Cochrane Protocols	2

Epistemonikos
https://www.epistemonikos.org/
Date searched: 3rd April 2024
Records retrieved: 348

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 04/01/2024 onwards, broad synthesis = 8, SR = 67

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 04/01/2024 onwards, broad synthesis = 1, SR = 10

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 04/01/2024 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 04/01/2024 onwards, broad synthesis = 4, SR = 21

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 04/01/2024 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 04/01/2024 onwards, broad synthesis = 7, SR = 52

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 04/01/2024 onwards, broad synthesis = 10, SR = 30

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 04/01/2024 onwards, broad synthesis = 1, SR = 1

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 04/01/2024 onwards, broad synthesis = 4, SR = 14

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*

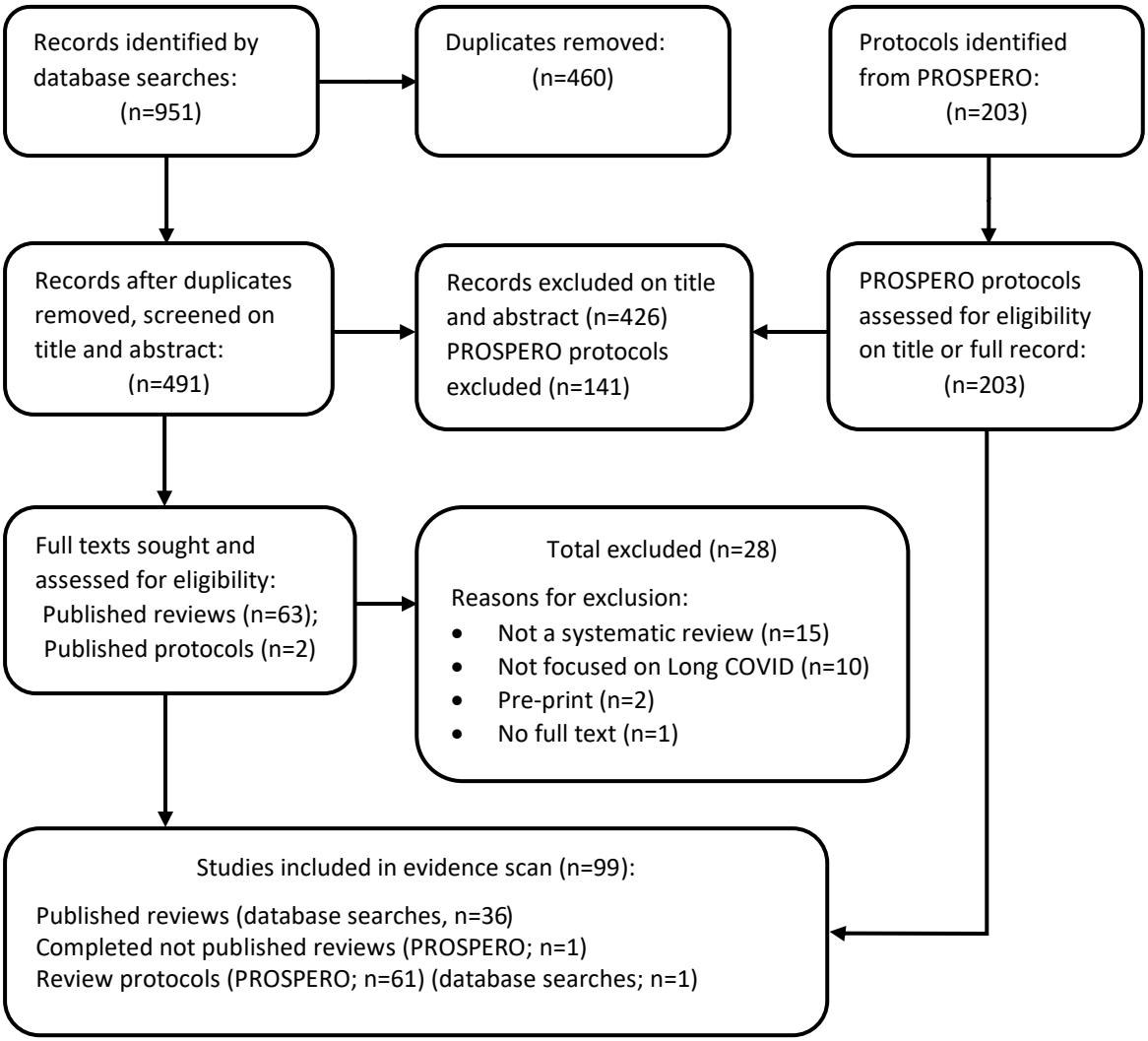
OR effect* OR complication* OR sequela* OR syndrome OR illness* OR disorder* OR dysfunction* OR impair* OR impact* OR consequence* OR manifest*)) AND (title:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2) 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 04/01/2024 onwards, broad synthesis = 24, SR = 89

PROSPERO search strategy
https://www.crd.york.ac.uk/prospero/
Searched from 4th January to 4th April, 2024
Records identified: 202

#1	long COVID OR post COVID OR PASC NOT Animal DB WHERE CD FROM 04/01/2024 TO 04/04/2024	112
#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 NOT Animal DB WHERE CD FROM 04/01/2024 TO 04/04/2024	4803
#3	COVID OR COVID-19 OR COVID19 OR coronavirus OR SARS-CoV-2 OR SARS-CoV2 OR SARSCoV2 OR SARSCoV-2 OR 2019-nCoV NOT Animal DB WHERE CD FROM 04/01/2024 TO 04/04/2024	445
#4	#2 AND #3	157
#5	#1 OR #4	202

NB. One additional record was found incidentally as it was by Kulangara and was found in an author search. It was not identified by the above searches as it was not tagged as Long COVID in PROSPERO, whereas the other two records by Kulangara were tagged with Long COVID.

Appendix 2: Flow of studies through the review



Appendix 3: Summary of reports and updates

Table 2: Summary of reviews (November 2021 to April 2024)

Report date	April 2024	Jan 2024	Oct 2023	July 2023	April 2023	Jan 2023	Oct 2022	July 2022	April 2022	Nov 2021
Period searched **Primary focus by review type**	Jan to Apr '24	Oct '23 to Jan '24	Jul to Oct '23	Apr to Jul '23	Jan to Apr '23	Oct '22 to Jan '23	Jul to Oct '22	Apr to Jul '22	Nov '21 to Apr '22	Up to Nov '21
Published reviews	**36**	**42**	**46**	**31**	**37**	**50**	**29**	**28**	**54**	**51**
Treatment[1]	5	7	11	5	5	5	5	3	11	3
Treatment[1] and prevention			1	1	2		2			
Treatment[1] and pathobiology[4]			1							
Treatment,[1] prevention and prevalence[2]			1							
Prevention	1	3			1	2	1			1
Prevalence[2]	21	18	20	16	21	31	19	22	38	47
Prevalence[2] and treatment[1]	1	2		1						
Prevalence[2] and pathobiology[4]				1	1					
Prevalence,[2] treatment[1] and economics			1							
Prevalence,[2] treatment,[1] and pathobiology[4]	1									
Risk factors[3]	5	9	1	6	3	8		3		
Risk factors[3] and treatment[1]		1				1	1			
Risk factors[3] and prevention						1				
Pathobiology[4]	2	2	6	1	3	2				
Risk factors[3] and pathobiology[4]			2						5	
Health and social or economics			1				1			
Public, patient involvement			1							
Treatment,[1] prevention, prevalence,[2] pathobiology[4] and diagnosis					1					
Completed not published	**1**	**1**	**3**	**1**	**5**		**2**		**5**	**9**
Treatment[1]	1			1	2				1	1
Prevalence[2]		1	2		3		2		4	7
Risk factors[3]			1							
Experiences										1

Ongoing reviews (protocols)	**62**	**41**	**41**	**52**	**68**	**56**	**63**	**59**	**73**	**77**
Treatment[1]	20	13	8	26	27	33	24	12	17	15
Treatment[1] and prevention			1		1		4			
Prevention	3	2	2	2		1		2	4	
Prevalence[2]	24	14	22	12	18	13	30	31	47	59
Prevalence[2] and treatment[1]		3		1		1				
Prevalence[2] and pathobiology[4]			1							
Risk factors[3]	8	7	6	6	13	4		10		
Risk factors[3] and treatment[1]		1								
Risk factors[3] and prevention	2					1				
Pathobiology[4]	4	1		3	4	3		3		
Risk factors[3] and pathobiology[4]				1			4		5	
Diagnosis or monitoring					3					
Health and social or economics	1		1	1	1		1	1		3
Experiences					1					

1. Treatment = treatment or rehabilitation. 2. Prevalence = prevalence of symptoms or effects. 3. Risk factors = risk factors with or without prevalence of symptoms or effects. 4. 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

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