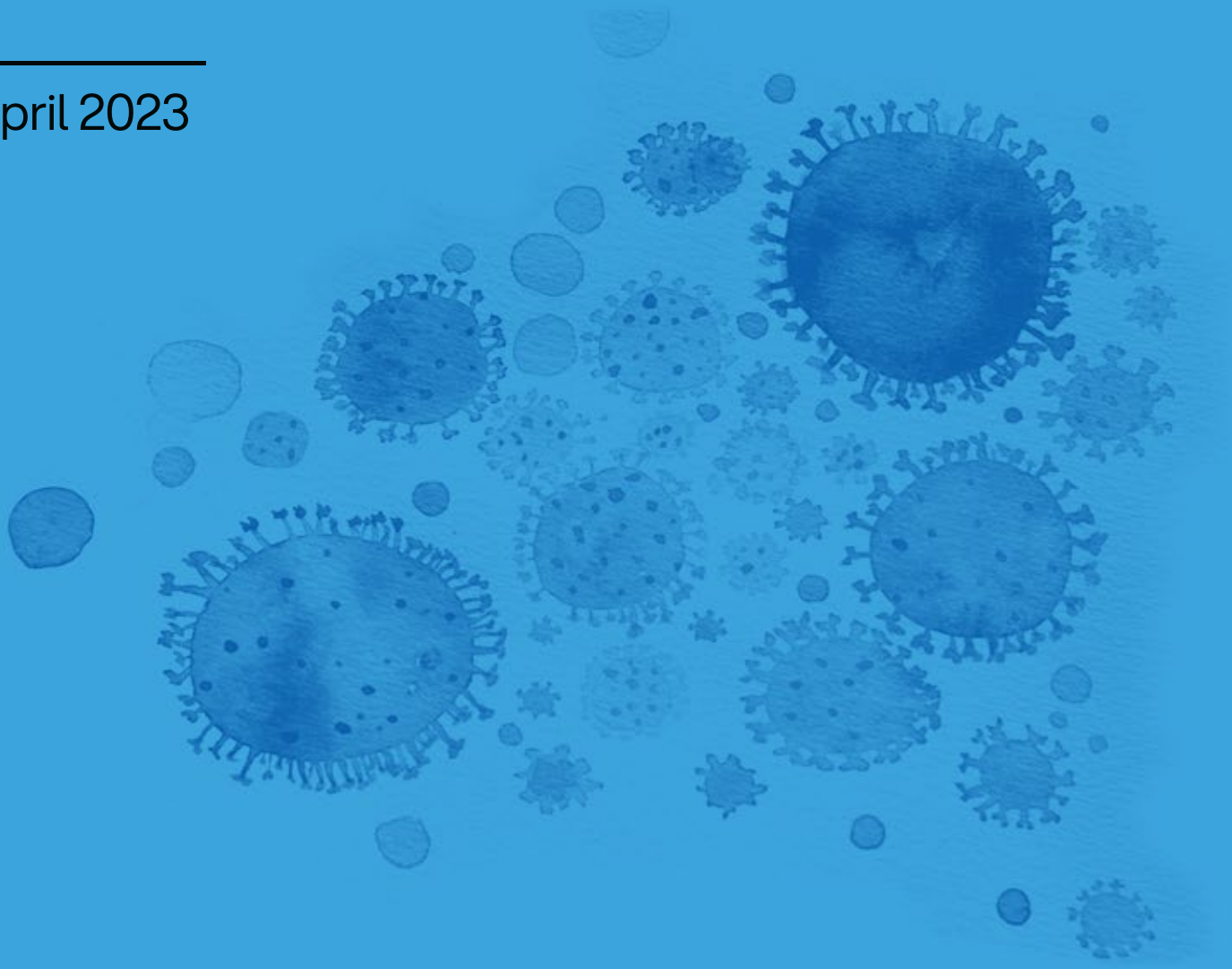
NIHR Policy Research Programme Reviews Facility

To support national policy development and implementation

Reviews on Long COVID

A scope of the literature: update

April 2023



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

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Summary

- For this update, we identified 37 published reviews and 73 new protocols for ongoing reviews on Long COVID. The number of published reviews is lower than in our last quarterly report in January (n=50), but higher than in our October report (n=29), all of which used the same databases and search strategy.
- Most published reviews were focused on symptoms or effects, which is consistent with the earlier reports.
- We identified fewer published reviews with a primary focus on Long COVID risk factors (3/37) than in January (10/50).
- Most of the protocols for ongoing reviews focused on Long COVID treatment or rehabilitation (30/73), as was the case in the January report (33/56).
- Most of the other protocols focused on symptoms or effects (21/73), or risk factors (13/73).

Introduction

This is the fifth update (sixth 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 2022 to January 2023.[1]

For the current update, we identified systematic reviews and review protocols focused on Long COVID that were published between early January 2023 and the start of April 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 April 2023 and were limited by date to capture those records added to the databases since the last update searches in January 2023. No language restrictions were applied. A further search of PROSPERO was undertaken by the review team on 4th April 2023 to identify any new ongoing reviews. Due to the rapid nature of the project, the database searches were designed to balance the need to retrieve as many relevant systematic reviews as possible against the limited time available for screening. The search strategies for MEDLINE, CINAHL, CDSR and Epistemonikos can be found in Appendix 1 (page 24).

Study selection

To be included, reviews needed to have a primary focus on Long COVID (however conceptualised and defined) and be systematic in nature. A review was considered systematic if it reported some

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

search terms and inclusion criteria, as well as the number of references retrieved and the number of studies included (with their references). 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.

Key findings

We screened 873 records and identified **37 published reviews, five protocols for completed but not published reviews, and 68 protocols for ongoing reviews**. The flow of studies through the review is shown in Appendix 2 (page 31). Table 1 provides a summary of all reviews identified for this update by focus. The full reference and aim/research questions for each included review are provided on pages 6 to 23. Table 2 (Appendix 3, page 32) provides a summary of the reviews identified across all six reports we have produced to date (April 2023, January 2023, October 2022, July 2022, April 2022, and November 2021).

Table 1: Summary of reviews (January to April 2023)

Review status Primary focus	Systematic review	Review of reviews	Evidence map
Published reviews (n=37)			
Treatment or rehabilitation	4		1
Treatment and prevention	2		
Prevention	1		
Symptoms or effects	21		
Risk factors or prevalence	3		
Pathobiology or mechanisms	3		
Symptoms and mechanisms	1		
Treatment, prevention, symptoms, pathology, diagnosis	1		
Completed not published (n=5)			
Treatment or rehabilitation	2		
Symptoms or effects	3		
Ongoing reviews (new protocols) (n=68)			
Treatment or rehabilitation	27		
Treatment and prevention	1		
Symptoms or effects	18		
Risk factors or prevalence	11	2	
Pathobiology and mechanisms	4		
Diagnosis or monitoring tools	2	1	
Health and economics	1		
Experiences	1		

Published reviews

The number of systematic reviews identified for this update (n=37) was less than in January 2023 (n=50) but more than in October 2022 (n=29). All three updates used the same databases and search strategy.

Most of the reviews focused on the symptoms or effects of Long COVID (21/37). One more review focused on symptoms alongside mechanisms (#36 Reyes-Long et al., 2023); and another review had a very broad focus that included treatment, prevention, symptoms, pathobiology, and diagnosis (#37 Hallek et al., 2023).

The number of reviews that focused on treatment or rehabilitation remained the same as in the previous two reports (n=5). Four of these were standard reviews and one was an update of a map of evidence on the treatment or rehabilitation of Long COVID (#1 Ostolin et al., 2023). The four standard treatment reviews focused on respiratory rehabilitation (#2 Ashra et al., 2023), olfactory training (#3 Hwang et al., 2023), digital interventions (#4 Rinn et al., 2023), or pharmacological interventions (#5 Saif-Ur-Rahman et al., 2023).

Two reviews, in this update, focused on treatment and prevention (#6 Ceban et al., 2023; #7 Watanabe et al., 2023), while there were none on treatment and prevention in the January 2023 update. One review focused solely on prevention (#8 Byambasuren et al., 2023); one less than in the January update. As in previous reports, all three reviews that included prevention focused on vaccination to prevent, or to treat and prevent, Long COVID. When added to the last two reports, there are now seven published reviews that include vaccination to prevent Long COVID.

Three reviews in this update focused on risk factors for Long COVID, whereas in the January 2023 report there were 10 reviews with this focus. Three reviews focused on the pathobiology or mechanisms of Long COVID; one more than in the January 2023 report.

None of the reviews identified for this update was a review of reviews.

Protocols – completed but not published reviews

In this update, we identified five protocols for completed but not published reviews (#42 Chaitani et al., 2023; #41 Espinoza and Martella, 2023; #40 Khalifa et al. 2023; #38 Sanchez-Garcia and Rodriguez-Blanque, 2023; and #39 Xu and Zhang, 2023). One was on rehabilitation (#38 Sanchez-Garcia and Rodriguez-Blanque, 2023), and one was on Chinese Medicine (#39 Xu and Zhang, 2023), while the other three were on symptoms or effects. In the previous update, we did not identify any protocols for completed reviews; while in our October 2022 report, we identified two protocols for completed reviews both on symptoms or effects.

Protocols - ongoing reviews

We identified 68 protocols for ongoing reviews, in this update, which is more than in the last two reports (January 2023, n=56; October 2022, n=63). Most of the reviews for this update were on one of three topics: treatment or rehabilitation (n=27); symptoms or effects (n=18); or risk factors (n=13). The 27 treatment protocols was less than we found in the January 2023 report (n=33), but slightly more than October 2022 (n=24). The 18 symptom protocols was more than in January (n=14), but less than October (n=30). The 13 risk factor protocols was much higher than January (n=5) and October (n=4, with pathobiology).

Ten of the 27 protocols for reviews of treatments focused on physiotherapy or rehabilitation (#43 da Conceição Perez et al., 2023; #44 Thomas and Morgan, 2023; #49 Liu et al., 2023; #52 Carvajal et al., 2023; #53 Du and Wang, 2023; #55 Liu et al., 2023; #56 Nantakool et al., 2023; #62 Zhang et al., 2023; #63 Dias et al., 2023; #65 Bu and Qian, 2023). Five protocols focused on Chinese medicine, exercises or acupuncture (#45 Cheng et al., 2023; #46 Cui et al., 2023; #48 Jiang et al., 2023; #58 Wang and Song, 2023; #59 Song et al., 2023). Five protocols focused on drug or vitamin treatments (#47 Wang and Lee, 2023; #50 Zhan et al., 2023; #54 Yong et al., 2023; #64 Li et al., 2023; #67 Al Aaraj et al., 2023). Three focused on psychological or mental health interventions (#60 Puwarawuttipanit et al., 2023; #61 Zheng and Ru, 2023; #69 Sugita et al., 2023), and two protocols included any intervention for fatigue symptoms (#66 You et al., 2023; #68 Luker et al., 2023). One protocol was for hyperbaric oxygen therapy (#51 Carmona et al., 2023), and the last one was on plasmapheresis (#57 Fox et al., 2023).

One protocol focused on the treatment or prevention of taste disorders in Long COVID (#70 Xiong et al., 2023). Eighteen protocols were for reviews of symptoms or effects, including heterotopic ossification, epilepsy, necrosis, diabetes, vocal aspects and general symptoms, among others. Thirteen protocols were for reviews on risk factors for Long COVID; two of these were reviews of reviews (#89 Ho et al., 2023; #90 Nurchis et al., 2023). Four protocols were for reviews on the pathobiology or mechanisms of Long COVID.

Three protocols were for reviews on diagnosis or monitoring tools. One of these was a systematic review of reviews on cardiovascular monitoring (#106 Kaplan et al., 2023). The other two were on patient-reported outcome measures (#107 Piontek et al., 2023), and the EQ-5D (#108 Lorgelly et al., 2023). One protocol was on disability-adjusted life-years associated with COVID and Long COVID (#109 Gebeyehu et al., 2023), and the last protocol was on qualitative experiences of Long COVID patients when resuming social roles (#110 Valerio et al., 2023).

1) Published Reviews

Treatment/rehabilitation (n=5)

Evidence map of reviews (n=1)

1. Ostolin T, Miranda R, Abdala CVM. [Evidence map on post-acute COVID-19 sequelae and rehabilitation: Update as of July 2022] Mapa de evidencia sobre las secuelas y la rehabilitacion tras la COVID-19 aguda: version actualizada en julio del 2022. *Pan American Journal of Public Health* 2023;47:e30. doi: https://dx.doi.org/10.26633/RPSP.2023.30

Aim: To update the evidence map on the effects of interventions for post-acute COVID-19 rehabilitation.

Standard systematic reviews (n=4)

2. Ashra F, Jen HJ, Liu D, et al. Effectiveness of respiratory rehabilitation in patients with COVID-19: A meta-analysis. *Journal of Clinical Nursing* 2023;21:21. doi: https://dx.doi.org/10.1111/jocn.16692

Aim: To examine the effectiveness of respiratory rehabilitation and moderating factors on lung function and exercise capacity in post-COVID-19 patients.

3. Hwang SH, Kim SW, Basurrah MA, et al. The Efficacy of Olfactory Training as a Treatment for Olfactory Disorders Caused by Coronavirus Disease-2019: A Systematic Review and Meta-Analysis. *American Journal of Rhinology & Allergy* 2023:19458924221150977. doi: https://dx.doi.org/10.1177/19458924221150977

Aim: To evaluate the effect of olfactory training on the olfactory dysfunction of patients infected with COVID-19.

4. Rinn R, Gao L, Schoeneich SM, et al. A Scoping Review of Digital Interventions that Treat Post-/Long-COVID (Digital Interventions for Treating Post-COVID or Long-COVID Symptoms: Scoping Review). *Journal of Medical Internet Research* 2023 doi: 10.2196/45711

Aim: To review evidence-based digital interventions, to help manage physical and mental health, for patients with Post-/Long-COVID.

5. Saif-Ur-Rahman KM, Kothari K, Sadlier C, et al. Effect of pharmacological interventions for the treatment of people with post-COVID-19 condition: A rapid review. *Cochrane Evidence Synthesis and Methods* 2023;1:e12001. doi: 10.1002/cesm.12001

Aim: To examine the effectiveness of pharmacological interventions for treating people with post-coronavirus disease 2019.

Treatment/rehabilitation and prevention (n=2)

Standard systematic reviews

6. Ceban F, Kulzhabayeva D, Rodrigues NB, et al. COVID-19 Vaccination for the Prevention and Treatment of Long COVID: A Systematic Review and Meta-analysis. *Brain, Behavior, & Immunity* 2023;27:27. doi: https://dx.doi.org/10.1016/j.bbi.2023.03.022

Aim: To determine the differential risk of Long COVID in vaccinated versus unvaccinated patients, and the trajectory of Long COVID following vaccination.

7. Watanabe A, Iwagami M, Yasuhara J, et al. Protective effect of COVID-19 vaccination against Long COVID syndrome: A systematic review and meta-analysis. Vaccine 2023;41:1783-90. doi: https://dx.doi.org/10.1016/j.vaccine.2023.02.008

Aim: To evaluate the association between COVID-19 vaccination and Long COVID.

Prevention (n=1)

Standard systematic reviews

8. Byambasuren O, Stehlik P, Clark J, et al. Effect of COVID-19 vaccination on Long COVID: systematic review. BMJ Medicine 2023;2:e000385. doi: https://dx.doi.org/10.1136/bmjmed-2022-000385

Aim: To determine the effect of COVID-19 vaccination, given before and after acute infection with the SARS-CoV-2 virus, or after a diagnosis of Long COVID, on the rates and symptoms of Long COVID.

Symptoms and effects (n=21)

Standard systematic reviews

9. Albright C, Limoges J, Rempel GR. Living with pulmonary sequelae of COVID-19 and the implications for clinical nursing practice: A qualitative systematised review. *Journal of Clinical Nursing* 2023;28:28. doi: https://dx.doi.org/10.1111/jocn.16664

Aim: To synthesise qualitative research on pulmonary sequelae of COVID-19 and identify patient needs and experiences to develop nursing care strategies.

10. Bazdar S, Kwee A, Houweling L, et al. A systematic review of chest imaging findings in Long COVID patients. *Journal of Personalized Medicine* 2023;13:01. doi: https://dx.doi.org/10.3390/jpm13020282

Aim: To provide an overview of lung imaging and its findings in Long COVID patients.

11. Chourasia P, Goyal L, Kansal D, et al. Risk of New-Onset Diabetes Mellitus as a Post-COVID-19 Condition and Possible Mechanisms: A Scoping Review. *Journal of Clinical Medicine* 2023;12:01. doi: https://dx.doi.org/10.3390/jcm12031159

Aim: To explore the current literature for the relationship between COVID-19 infection and new-onset diabetes mellitus four weeks after acute infection.

NB This is probably the publication for a protocol included in our October report

12. Diekman S, Chung T. Post-acute sequelae of SARS-CoV-2 (PASC) syndrome presenting as postural orthostatic tachycardia syndrome (POTS). *Clinical & Experimental Emergency Medicine* 2023;01:30. doi: https://dx.doi.org/10.15441/ceem.22.409

Aim: To review the current literature on POTS and dysautonomia in PASC in order to better understand the overlap and distinction between these pathologies.

13. Gomez Gutierrez OA, McQuary GS, Gonzalez-Urquijo M, et al. Readmission After COVID-19 for Late Acute Venous Thrombosis; CASE SERIES and Systematic Review of the Literature. *Vascular & Endovascular Surgery* 2023:15385744231163976. doi: https://dx.doi.org/10.1177/15385744231163976

Aim: To assess heterogeneity within patients with resolved COVID-19 to broaden the vision about post-discharge thrombotic cases and postulate possible related mechanisms in search of better anticoagulation guidelines.

14. Hirt J, Janiaud P, Gloy VL, et al. Robustness of reported postacute health outcomes in children with SARS-CoV-2 infection: a systematic review. *Archives of Disease in Childhood* 2022;02:02. doi: https://dx.doi.org/10.1136/archdischild-2022-324455

Aim: To assess the robustness of reported postacute SARS-CoV-2 infection health outcomes in children.

15. Hossain MM, Das J, Rahman F, et al. Living with "Long COVID": A systematic review and meta-synthesis of qualitative evidence. *PLoS ONE [Electronic Resource]* 2023;18:e0281884. doi: https://dx.doi.org/10.1371/journal.pone.0281884

Aim: To synthesise the qualitative evidence on lived experiences of people living with Long COVID that may inform health policymaking and practice.

16. Korchut A, Rejdak K. Late neurological consequences of SARS-CoV-2 infection: New challenges for the neurologist. *Frontiers in Neuroscience* 2023;17:1004957. doi: https://dx.doi.org/10.3389/fnins.2023.1004957

Aim: To study the frequency of neurological symptoms and diseases in adult patients with COVID-19 that may be late consequences of SARS-CoV-2 infection.

17. Kouranloo K, Dey M, Elwell H, et al. A systematic review of the incidence, management and prognosis of new-onset autoimmune connective tissue diseases after COVID-19. *Rheumatology International* 2023;14:14. doi: https://dx.doi.org/10.1007/s00296-023-05283-9

Aim: To review the literature on new-onset autoimmune connective tissue diseases (ACTDs) following COVID-19.

18. Manfredini A, Pisano F, Incoccia C, et al. The Impact of COVID-19 Lockdown Measures and COVID-19 Infection on Cognitive Functions: A Review in Healthy and Neurological Populations. *International Journal of Environmental Research & Public Health [Electronic Resource]* 2023;20:10. doi: https://dx.doi.org/10.3390/ijerph20064889

Aim: To present a comprehensive overview of the literature related to the effects of COVID-19 lockdown measures and COVID-19 infection on cognitive functioning in both healthy people and people with neurological conditions by considering only standardized tests.

19. Reis Carneiro D, Rocha I, Habek M, et al. Clinical presentation and management strategies of cardiovascular autonomic dysfunction following a COVID-19 infection - A systematic review. *European Journal of Neurology* 2023;24:24. doi: https://dx.doi.org/10.1111/ene.15714

Aim: To understand the acute and mid-term effects of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection on cardiovascular autonomic function.

20. Shrestha AB, Mehta A, Pokharel P, et al. Long COVID Syndrome and Cardiovascular Manifestations: A Systematic Review and Meta-Analysis. *Diagnostics* 2023;13:29. doi: https://dx.doi.org/10.3390/diagnostics13030491

Aim: To conduct comprehensive evaluations of cardiovascular outcomes in post-COVID syndrome, so as to guide clinical practice for the early detection and management of post-COVID cardiovascular sequelae.

21. Slouma M, Abbes M, Mehmli T, et al. Reactive arthritis occurring after COVID-19 infection: a narrative review. *Infection* 2023;51:37-45. doi: 10.1007/s15010-022-01858-z

Aim: To summarise the current findings of reactive arthritis following COVID-19 infection.

22. Teodoro T, Chen J, Gelauff J, et al. Functional neurological disorder in people with Long COVID: A systematic review. *European Journal of Neurology* 2023;31:31. doi: https://dx.doi.org/10.1111/ene.15721

Aim: To review the evidence on patients with functional neurological symptoms amongst cohorts diagnosed with Long COVID.

23. Velichkovsky BB, Razvaliaeva AY, Khlebnikova AA, et al. Attention and memory after COVID-19 as measured by neuropsychological tests: Systematic review and meta-analysis. *Acta Psychologica* 2023;233:103838. doi: https://dx.doi.org/10.1016/j.actpsy.2023.103838

Aim: To investigate specific cognitive functions impacted by COVID-19.

24. Velichkovsky BB, Razvaliaeva AY, Khlebnikova AA, et al. Systematic Review and Meta-Analysis of Clinically Relevant Executive Functions Tests Performance after COVID-19. *Behavioural Neurology* 2023;2023:1094267. doi: https://dx.doi.org/10.1155/2023/1094267

Aim: To determine to what extent executive functions are impaired after recovery from COVID-19.

25. Wang Z, Peng Y, Chen M, et al. The Prevalence of Irritable Bowel Syndrome after Severe Acute Respiratory Syndrome Coronavirus 2 Infection and Their Association: A Systematic Review and Meta-Analysis of Observational Studies. *Journal of Clinical Medicine* 2023;12:27. doi: https://dx.doi.org/10.3390/jcm12051865

Aim: To investigate the prevalence of irritable bowel syndrome (IBS) after severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and assess the association between IBS and SARS-CoV-2 infection.

26. Williams LD, Zis P. COVID-19-Related Burning Eye Syndrome and Burning Mouth Syndrome: A Systematic Review and Meta-analysis. *Pain and Therapy* 2023;14:14. doi: https://dx.doi.org/10.1007/s40122-023-00492-3

Aim: To establish the prevalence of COVID-19-related burning eye syndrome and COVID-19-related burning mouth syndrome and describe their phenomenology.

27. Williams LD, Zis P. COVID-19-Related Neuropathic Pain: A Systematic Review and Meta-Analysis. *Journal of Clinical Medicine* 2023;12:20. doi: https://dx.doi.org/10.3390/jcm12041672

Aim: To establish the prevalence and determinants of neuropathic pain amongst COVID-19-infected individuals.

28. Wu Y, Qiao L, Bao M, et al. Prevalence of Sleep Disorders Among Survivors of Severe COVID-19 Infections: A Meta-Analysis. *Asia-Pacific Journal of Public Health* 2023:10105395231158836. doi: https://dx.doi.org/10.1177/10105395231158836

Aim: To estimate the prevalence of sleep disorders in severe COVID-19 cases.

29. Zuin M, Barco S, Giannakoulas G, et al. Risk of venous thromboembolic events after COVID-19 infection: a systematic review and meta-analysis. *Journal of Thrombosis & Thrombolysis* 2023;18:18. doi: https://dx.doi.org/10.1007/s11239-022-02766-7

Aim: To assess the risk of acute pulmonary embolism and deep vein thrombosis in COVID-19 recovered subjects.

Risk factors; risk factors and prevalence (n=3)

Standard systematic reviews

30. Tsampasian V, Elghazaly H, Chattopadhyay R, et al. Risk Factors Associated With Post-COVID-19 Condition: A Systematic Review and Meta-analysis. *JAMA Internal Medicine* 2023;23:23. doi: https://dx.doi.org/10.1001/jamainternmed.2023.0750

Aim: To evaluate the demographic characteristics and comorbidities that have been found to be associated with an increased risk of developing a post-COVID-19 condition.

31. Yuan N, Lv ZH, Sun CR, et al. Post-acute COVID-19 symptom risk in hospitalized and non-hospitalized COVID-19 survivors: A systematic review and meta-analysis. *Frontiers in Public Health* 2023;11:1112383. doi: https://dx.doi.org/10.3389/fpubh.2023.1112383

Aim: To compare potential COVID-19 long-term effects in hospitalised and non-hospitalised COVID-19 survivors.

32. Zheng YB, Zeng N, Yuan K, et al. Prevalence and risk factor for Long COVID in children and adolescents: A meta-analysis and systematic review. *Journal of Infection and Public Health* 2023;16:660-72. doi: https://dx.doi.org/10.1016/j.jiph.2023.03.005

Aim: To review the available literature and determine the pooled prevalence of, and risk factors for Long COVID among the pediatric survivors.

Pathobiology and mechanisms (n=3)

Standard systematic reviews

33. Boparai Montek S, Musheyev B, Khan U, et al. Cardiac Magnetic Resonance Imaging of COVID-19-Associated Cardiac Sequelae: A Systematic Review. *Reviews in Cardiovascular Medicine* 2022;23:1-9. doi: 10.31083/j.rcm2312389

Aim: To analyse the cardiac magnetic resonance findings and biomarkers of COVID-19 related cardiac sequela after SARS-CoV-2 infection.

34. Lai YJ, Liu SH, Manachevakul S, et al. Biomarkers in Long COVID-19: A systematic review. *Frontiers in Medicine* 2023;10:1085988. doi: https://dx.doi.org/10.3389/fmed.2023.1085988

Aim: To evaluate blood biomarkers that may act as indicators or therapeutic targets for Long COVID.

35. Yong SJ, Halim A, Halim M, et al. Inflammatory and vascular biomarkers in post-COVID-19 syndrome: A systematic review and meta-analysis of over 20 biomarkers. *Reviews in Medical Virology* 2023;33:e2424. doi: https://dx.doi.org/10.1002/rmv.2424

Aim: To meta-analyse studies measuring levels of inflammatory and vascular biomarkers in blood, serum, or plasma of COVID-19 survivors with post-COVID-19 syndrome (PCS) versus non-PCS controls.

Symptoms and mechanisms (n=1)

Standard systematic review

36. Reyes-Long S, Cortes-Altamirano JL, Bandala C, et al. Role of the MicroRNAs in the Pathogenic Mechanism of Painful Symptoms in Long COVID: Systematic Review. *International Journal of Molecular Sciences* 2023;24:10. doi: https://dx.doi.org/10.3390/ijms24043574

Aim: To show the prevalence of chronic pain-like symptoms of patients with long COVID and to propose miRNAs as important components in their development, based on expression profiles in patients with acute COVID-19.

Treatment, prevention, symptoms, pathology, and diagnosis (n=1)

Standard systematic review

37. Hallek M, Adorjan K, Behrends U, et al. Post-COVID Syndrome. *Deutsches Arzteblatt International* 2023;120:48-55. doi: https://dx.doi.org/10.3238/arztebl.m2022.0409

Aim: Not reported – summarises the literature on post-COVID syndrome and makes recommendations.

2) Protocols for completed but not published reviews related to Long COVID (n=5)

Treatment/rehabilitation (n=2)

38. Juan Carlos Sanchez-Garcia, Raquel Rodríguez-Blanque. Physical therapies after COVID-19: systematic review. PROSPERO 2023 CRD42023391811 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023391811

Review question: Can physical therapy improve or palliate sequelae after SARS-CoV-2 infection?

39. Li Xu, Jiawei Zhang. Traditional Chinese Medicine Treatment of Insomnia after the Infection of COVID-19: A Systematic Review. PROSPERO 2023 CRD42023400106 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023400106

Review question: Traditional Chinese Medicine Treatment of Insomnia after the Infection of COVID-19: A Systematic Review.

Symptoms and effects (n=3)

40. Ahmed Khalifa, Ahmed Abdelazim A. Hassan Hassan. Femoral head avascular necrosis post COVID-19: a systematic review. PROSPERO 2023 CRD42023390075 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023390075

Review question: What are the incidence and causes of femoral head avascular necrosis in patients diagnosed with COVID-19?

41. Claudia Espinoza, Diana Martella. Cognitive functions in survivors of COVID-19, approach strategies and impact on health systems: a systematic review. PROSPERO 2023 CRD42023387742 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023387742

Review question: To investigate cognitive functions in survivors of COVID-19, approach strategies and impact on health systems.

42. Hachem Chaitani, Fabeck Laurent, Simon Koulischer. Systematic literature review of case reports and case series: heterotopic ossifications following COVID-19 infections. PROSPERO 2023 CRD42023393516 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023393516

Review question: What features do patients with heterotopic ossifications following a COVID-19 infection have?

3) Protocols for ongoing reviews related to Long COVID (n=68)

Treatment/rehabilitation (n=27)

Standard systematic reviews

43. Amanda Maria da Conceição Perez, Malki-çedheq Benjamim Celso da Silva Silva, Leiliane Patrícia Gomes de Macêdo Macêdo, Admilson de Castro Chaves Filho Chaves, Rosa Amalia Fireman Dutra Dutra, Marco Aurélio Benedette Rodrigues Rofrigues. Physiotherapy management of main functional changes in patients after COVID-19 infection: a systematic review. PROSPERO 2023 CRD42023401750 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023401750

Review questions: Can physiotherapeutic management help in the rehabilitation of functional changes in post-COVID-19 patients? What are the main functional rehabilitation strategies in the treatment of post-COVID-19 individuals?

44. Bini Thomas, Sandra Morgan. The Impact of Physical Therapy Interventions on Functional Outcomes and Quality of Life in Patients post COVID-19. PROSPERO 2023 CRD42023393469 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023393469

Review question: What is the impact of physical therapy on Functional Outcomes and Quality of Life in patients post COVID-19.

45. Guangyu Cheng, Xueqing Wang, Qi Zhang, Hua Cui, Wentao Yang, Xuan Wang, Chaojie Wang, Qingzhuo Ji, Weiping Cheng. Effectiveness and safety of external treatment of traditional Chinese medicine for Long COVID: a protocol for systematic review and meta-analysis. PROSPERO 2023 CRD42023411286 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023411286

Review question: We aim to conduct a systematic review and meta-analysis to evaluate the effectiveness and safety of external treatment of traditional Chinese medicine (TCM) for patients with Long COVID.

46. Hua Cui, Wentao Yang, Xuan Wang, Weiping Cheng. Effect of traditional Chinese exercise on the treatment of "long-COVID" A protocol for systematic review and meta-analysis. PROSPERO 2023 CRD42023402517 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023402517

Review question: To accurately evaluate the efficacy of traditional Chinese exercises on patients with Long COVID-19, and to provide alternative treatments for Long COVID-19.

47. Jian Ying Wang, Ming-Chia Lee. Corticosteroids for COVID-19-Induced Olfactory Dysfunction: A Comprehensive Systematic Review and Meta-Analysis of Randomized Controlled Trials. PROSPERO 2023 CRD42023404491 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023404491

Review question: In COVID-19 patients with olfactory dysfunction, what is the effectiveness of corticosteroid treatment (intervention) compared to placebo or no treatment (comparison) in improving olfactory dysfunction (outcome)?

48. Jiang Limei, Xingxin Wang, Jun Chen, Jiguo Yang. Bodybuilding qigong in the treatment of "chronic COVID": a systematic review and meta-analysis protocol. PROSPERO 2023 CRD42023403285 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023403285

Review question: How does Body-building qigong treat “long-COVID”?

49. Jue Liu, Jie Deng, Min Du. Interventions and effects for rehabilitation from post-COVID-19 conditions: a systematic review and meta-analysis. PROSPERO 2023 CRD42023412605 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023412605

Review question: What are the interventions to help with rehabilitation from post-COVID-19 conditions? How effective are these interventions?

50. Kangmin Zhan, Jun Wang, lixue Dai. Efficacy and safety of the Pirfenidone and Nintedanib in post-COVID-19 pulmonary fibrosis: a systematic review and meta-analysis. PROSPERO 2023 CRD42023408748 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023408748

Review question: To investigate the efficacy and safety of the Pirfenidone and Nintedanib in post-COVID-19 pulmonary fibrosis.

51. Montserrat Carmona, Luis M. Sánchez-Gómez, Esther E. García-Carpintero. Hyperbaric oxygen therapy for improving symptoms of Long COVID-19 syndrome: systematic review. PROSPERO 2023 CRD42023411833 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023411833

Review question: To assess the efficacy and safety of hyperbaric oxygen therapy (HBOT) in patients with Long COVID-19.

52. Nathali Carvajal, Alejandro Segura Ordoñez, Harry Garcia Muñoz, Flor Jimena Castillo Choco, Silvana Ruiz Trujillo, Leidy Geraldin Landazury Riascos. Effectiveness of pulmonary rehabilitation in post-COVID-19 patients: a systematic review. PROSPERO 2023 CRD42023368896 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023368896

Review question: Is pulmonary rehabilitation effective for the improvement of dyspnoea, aerobic capacity, quality of life, functionality, decrease in hospital stay, number of hospitalisations and survival, in post-COVID-19 patients?

53. Shan Du, Tianwen Wang. Effect of exercise intervention for physical recovery of Post-COVID-19 patients: a systematic review and meta-analysis. PROSPERO 2023 CRD42023399224

Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023399224

Review question: Effect of exercise intervention for physical recovery of Post-COVID-19 patients.

54. Shin Jie Yong, Alice Halim, Michael Halim. Systematic review of experimental drugs in clinical trials for long-COVID: what's in the pipeline? PROSPERO 2023 CRD42023409733 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023409733

Review question: Our systematic review sought to summarize and evaluate published and registered clinical trials that investigate pharmacological therapies for long-COVID, as well as to provide a critical appraisal of the quest to treat long-COVID.

55. Shuang Liu, Jingye Yang, Yun Guo, Bo Gou, Qi Han, Qirong Wang. Effect of Breathing Exercise on Post-COVID-19 Patients. PROSPERO 2023 CRD42023398285 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023398285

Review question: The purpose of this meta-analysis is to comprehensively investigate the effects of various forms of breathing exercise on patients infected with COVID-19.

56. Sothida Nantakool, Busaba Chuatrakoon, Piangkwan Sa-nguanmoo, Supatcha Konghakote. Effect of exercise rehabilitation program on cardiorespiratory fitness in individuals with post COVID-19: A systematic review and Meta-analysis. PROSPERO 2023 CRD42023393318 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023393318

Review question: Does exercise rehabilitation program improve the cardiorespiratory fitness in individuals with post COVID-19?

57. Tilly Fox, Beverley Hunt, Robert Ariens, Greg Towers, Robert Lever, Paul Garner, Rebecca Kuehn. Plasmapheresis to remove amyloid fibrin(ogen) particles for treating the post-COVID-19 syndrome. PROSPERO 2023 CRD42023401431 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023401431

Review question: What is the rationale, safety and efficacy of plasmapheresis to remove amyloid fibrin(ogen) particles in individuals with post-COVID-19 syndrome?

58. Wang Haoran, Wenjing Song. Effect of acupuncture combined with medication on patients with taste disorders after from COVID-19: a protocol of systematic review and meta-analysis. PROSPERO 2023 CRD42023397071 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023397071

Review question: We aimed to conduct a systematic review and meta-analysis of the effects of acupuncture combined with medication on patients with post-COVID-19 dysgeusia.

59. Wenjing Song, Wenjing Huang, Qiang Tang. Comparative efficacy of different acupuncture therapies for patients with post-COVID-19 chronic fatigue syndrome: A protocol for systematic review and network meta-analysis of randomized controlled trials. PROSPERO 2023 CRD42023393052 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023393052

Review question: We aim to perform a first reticulated meta-analysis to compare different acupuncture therapies, rank their effectiveness and evaluate which approach is best appropriate for chronic fatigue syndrome.

60. Wimolrat Puwarawuttipanit, Udsaneyaporn Pollayut, Kritsaya Ponghan, Khemra Chea. Mind-body intervention in patients with post COVID condition: A systematic review. PROSPERO 2023 CRD42023385388 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023385388

Review questions: What are Mind - body intervention types in patients with post COVID -19 conditions? What are the characteristics of Mind - body intervention of post-COVID-19 conditions? What are the effects of Mind - body intervention on measurement outcomes.

61. Xiaoyan Zheng, YI RU. Psychological interventions for Post-COVID-19 Syndrome: A systematic review and meta-analysis. PROSPERO 2023 CRD42023384800 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023384800

Review question: To determine the comparative effectiveness and safety of psychological interventions for Post-COVID-19 Syndrome.

62. Xin Zhang, Qing-tang YANG, Li-na XIA. Respiratory rehabilitation protocols for patients with COVID-19: a systematic review and meta-analysis. PROSPERO 2023 CRD42023393327 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023393327

Review question: The aim of this meta-analysis is to evaluate the efficacy of respiratory rehabilitation in improving lung function in patients infected with COVID-19 based on available studies.

63. Yago Dias, Mateus Santos, Suzana Santos, Felipe Silva, Patricia Coertjens. Adherence, validity and effects of telerehabilitation in post-COVID-19 patients: a systematic review and meta-analysis. PROSPERO 2023 CRD42023398672 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023398672

Review question: What is the adherence, validity, reliability, in addition, cardiorespiratory effects and physical fitness changes resulting from telerehabilitation in post-COVID-19 patients threating for COVID-19 sequelae?

64. Yan Li, Zhixuan Zhao, Jun Yan, Yingji Wang. Vitamin supplement for Long COVID: a protocol for systematic review and meta-analysis. PROSPERO 2023 CRD42023398165 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023398165

Review question: What is the role of vitamin supplements in Long COVID?

65. Zhenglong Bu, Yu Qian. Effect of exercise program on Exercise Capacity and Lung Functions in Patients With COVID-19: A Systematic Review and Meta-analysis. PROSPERO 2023 CRD42023396008 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023396008

Review question: The coronavirus disease 2019 (COVID-19) pandemic caused the severe acute respiratory syndrome. Also, respiratory syndrome can last for a few months. So far, there is much evidence supporting that physical activities can efficiently enhance post-COVID-19 patients' respiratory function and exercise capacity. There's no consensus yet about how effective exercise programs really are.

66. Zhixuan You, Yining Huang, Haotian Zhang. Which is the optimal way to recover from persistent fatigue with bodily pain or mood swings in individuals previously infected with

COVID-19: a network meta-analysis. PROSPERO 2023 CRD42023395319 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023395319

Review question: The overall objective of this study is to evaluate the overall effectiveness, uses, and safety of different therapies to reduce COVID-induced persistent fatigue with bodily pain or mood swings in individuals previously infected with COVID-19.

67. Mahmoud Al Aaraj, Mustafa Boorenie, Louay Salfity, Ahmed Eweiss. Systematic review: treatment of COVID-19 induced olfactory dysfunction using platelet rich plasma. PROSPERO 2023 CRD42023400048 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023400048

Review question: Is platelet rich plasma effective in improving symptoms in patients complaining of COVID-19 related olfactory dysfunction?

68. Subbuh Luker, Kate Laver, Jonathan Karnon, Ian Cameron, Maria Crotty, Zoe Adey-Wakeling. Interventions to reduce symptoms of post-viral fatigue. PROSPERO 2023 CRD42023399789 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023399789

Review question: What treatments are effective in reducing symptoms of fatigue in people with post-viral fatigue?

69. Sugita S, Hata K, Takamatsu N, et al. Psychological treatments for the mental health symptoms among individuals infected with COVID-19: a scoping review protocol. BMJ Open 2023;13:e069386. doi: https://dx.doi.org/10.1136/bmjopen-2022-069386

Review question: We sought to provide an updated synthesis of the available evidence of treatments for the range of mental health symptoms associated with COVID-19.

This review protocol was published in a journal, rather than found on PROSPERO

Treatment/rehabilitation and prevention (n=1)

Standard systematic review

70. Yutao Xiong, Chang Liu, Tao Zhu, Wei Tang, Wei Zeng. Interventions for the prevention and treatment measures of post-COVID-19 taste disorders: a systematic review and meta-analysis. PROSPERO 2023 CRD42023395054 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023395054

Review question: The purpose of this study is to explore any intervention to treat or prevent the occurrence of COVID-19-related taste disorders.

Symptoms and effects (n=18)

Standard systematic reviews

71. Chiara Minotti, Carla McKenzie, Carien Bekker, Isabelle Dewandel, Denis Doni, Giulia Sturniolo, Marieke M. Van Der Zalm, Daniele Donà. Post-viral conditions in childhood. How does post-COVID-19 condition differ from others? A systematic review. PROSPERO 2023 CRD42023401789 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023401789

Review questions: What are the differences in duration of Post-COVID-19 condition vs other post-viral conditions? What are the differences in symptoms of Post-COVID-19 condition vs other post-viral conditions? What are the differences in duration and symptoms according to age groups

(infants and young children vs older children and adolescents)? What are the social and economic burden/healthcare burden, measured through lost school/work days and number of Emergency Department evaluations/hospital admission days, if applicable?

72. David Marra, James Hoelzle, Victoria Sanborn, Mary Simons. Neurocognitive sequalae of COVID-19 Infection. PROSPERO 2023 CRD42023332070 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023332070

Review question: How COVID-19 infection affects cognitive functioning over time; how the effect of COVID-19 infection on cognition differs based on disease severity (e.g., asymptomatic, mild, moderate, severe); and pertinent variables that may moderate cognitive functioning post-infection (e.g., age).

73. Fidan Turk, Jennifer Sweetman, Christina van der Feltz-Cornelis. Prevalence of mental disorders in Long COVID: A Systematic Review. PROSPERO 2023 CRD42023394105 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023394105

Review questions: What is the estimate of the prevalence of mental disorders such as depression, anxiety, cognitive problems (brain fog) in Long COVID? What are the risk factors for development of mental disorders in Long COVID, including pre-existing mental disorders?

74. Haoxin Liu, Yingying Tian, Fuying Tao. The incidence of postoperative complications and mortality in adult patients who recovered from COVID-19 were compared with those who were not infected with COVID-19: a systematic review. PROSPERO 2023 CRD42023395067 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023395067

Review question: To compare the incidence of postoperative complications and mortality between COVID-19 convalescent patients and non-infected patients, and to explore the impact of post COVID-19 syndrome on the prognosis of surgical patients.

75. Heber de Arruda Antunes, Maria de Lourdes Ramos Sousa Pinheiro, Vinícius Tassoni Civile, Álvaro Nagib Atallah. New-onset diabetes and COVID-19: a systematic review. PROSPERO 2023 CRD42023370777 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023370777

Review question: Is there a causal association between SARS-CoV-2 infection and diabetes mellitus of any type?

76. Idris Choudrey, Eirini Mavritsaki, Jeffery Wood, John Galvin, Zoe Kourtzi. COVID-19 affect on Visual Attention. PROSPERO 2023 CRD42023413047 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023413047

Review question: How does COVID-19 and Long COVID affect visual attention?

77. Irene Torres-Sánchez, Laura Pérez-Gisbert. Evolution of post-COVID-19 fatigue: A systematic review and meta-analysis. PROSPERO 2023 CRD42023391357 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023391357

Review question: How has post-COVID-19 fatigue evolved in surviving patients of the disease?

78. Marcel Ottiger, Katrin Müller, Iris Poppele, Naveen Sperling, Torsten Schlesinger. Work ability and return-to-work of patients with post-COVID-19: a systematic review. PROSPERO

2023 CRD42023385436 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023385436

Review question: What is the impact of post-COVID-19 on work ability and the return-to-work process of patients previously infected with SARS-CoV-2?

79. Pollyana Diedio, Daniela Hencke. Systematic review on vocal aspects after COVID-19. PROSPERO 2023 CRD42023398081 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023398081

Review question: What are the vocal aspects that may appear during and after the COVID-19 infection?

80. Qinyao Huang, Yunxia Huang, Yijie Liao, Hongbin Luo, Zhuofeng Wen. Association between Long COVID-19 and Heart Failure risk: A pool of cohort studies and Mendelian randomization analysis. PROSPERO 2023 CRD42023387141 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023387141

Review question: The primary aim of this study was to investigate the association of COVID-19 and Heart Failure risk using meta-analysis and Mendelian randomisation analysis.

81. Sothida Nantakool, Busaba Chuatrakoon, Piangkwan Sa-nguanmoo, Supatcha Konghakote. Impact of SARS-CoV-2 virus on cardiorespiratory fitness: A systematic review and Meta-analysis. PROSPERO 2023 CRD42023393108 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023393108

Review question: Does SAR-CoV-2 virus affect a reduction in cardiorespiratory fitness in the COVID-19 survivors?

82. Uday Ghoshal, Akash Mathur. Disorders of gut-brain interaction following Coronavirus disease-19: A systematic review and meta-analysis. PROSPERO 2023 CRD42023337727 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023337727

Review question: To investigate the frequency of persistent GI (gastrointestinal) symptoms post COVID-19.

83. Vitória Rauena da Silva Sousa, Maria Letícia de Carvalho Alves, Éric da Silva. Functional Capacity Assessment Instruments In Post COVID-19 Patients: Systematic Review. PROSPERO 2023 CRD42023382761 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023382761

Review question: What instruments and ways of assessing functional capacity are applied to measure functional capacity in patients with post COVID 19 syndrome?

84. Yang Xiao, Chenyu Li. Association between post-COVID-19 pulmonary fibrosis and diabetes: a systematic review and meta-analysis. PROSPERO 2023 CRD42023398645 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023398645

Review question: The aim is to conduct a systematic review and meta-analysis exploring whether there is an association between post-COVID-19 pulmonary fibrosis and diabetes.

85. Yanhong Wang, Na Wang, Meiling Wang. Physical and Emotional Deficits in SARS-CoV-2 Infected Patients: A Systematic Review and Meta-analysis. PROSPERO 2023

CRD42023396306 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023396306

Review question: This study was aimed to estimate the prevalence of anosmia, fatigue, anxiety, and depression in COVID-19 infected patients and duration, and to evaluate if there is any significant association between Physical Deficits and Emotional Deficits.

86. Guanwei Zhang, Jiajuan Guo, Hongguang Jin, Xiaojing Wei, Weitao Jia, Yongsheng Huang. Association between after COVID-19 recovery and adverse cardiovascular outcomes: a protocol for systematic review and meta-analysis. PROSPERO 2023 CRD42023406111 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023406111

Review question: The current study will aim to investigate the association between COVID-19 and all-cause mortality, CVD (cardiovascular disease) mortality, stroke, heart failure, and myocardial infarction, in cohort studies using a systematic review and meta-analysis.

87. Rui Cui, Shan Jiang. The effects of COVID-19 infection on working memory: a systematic review. PROSPERO 2023 CRD42023413454 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023413454

Review question: What are the effects of COVID-19 infection on working memory?

88. Yingjie Shen, Anqi Peng, Xujing Zhao, Guoqiang Xue, Sha Bai, Zhongjun Wei, Mengkai Li. Epileptic onset in adolescents associated with COVID-19 infection: a systematic review and meta-analysis. PROSPERO 2023 CRD42023398656 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023398656

Review question: Prevalence and onset of epilepsy in children and adolescents triggered by COVID-19 infection.

Risk factors; risk factors and prevalence (n=13)

Review of reviews (n=2)

89. Yi-Chen Ho, Yao-Te Tsai, Yi-Jhen Chen, Chun-Yin Yeh, Hsiao-Ying Hung, Pei-Chun Lai, Nai-Ying Ko. Prevalence of adult Long COVID: an umbrella review. PROSPERO 2023 CRD42023393916 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023393916

Review question: To estimate the prevalence and symptoms of Long COVID among adults diagnosed with COVID-19 from systematic reviews.

90. Mario Cesare Nurchis, Aurora Heidar Alizadeh, Domenico Pascucci, Jacopo Garlasco, Alberto Peano, Alessandro Mara, Gianfranco Damiani, Maria Michela Gianino. Most common predictors and symptoms of Post-COVID Condition (PCC): an umbrella review. PROSPERO 2023 CRD42023396122 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023396122

Review question: To investigate the most common predictors and symptoms associated with Post-COVID Condition (PCC) in pediatric population.

Standard systematic reviews (n=11)

91. Arman Shafiee, Mobin Teymouri, Hedieh Soltani. The global prevalence of depression, anxiety, and sleep disorder among patients coping with Post COVID-19 syndrome: a

systematic review and meta-analysis. PROSPERO 2023 CRD42023413023 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023413023

Review question: What is the prevalence of depression, anxiety, and sleep disorder among patients coping with Post COVID-19 syndrome?

92. Kadio Jean-Jacques Olivier Kadio, Abdoulaye Toure, Maryline Bonnet, Adrien Fapeingou Tounkara, Mamadou Saliou Sow, Castro Gbêmêmali Hounmenou, Laila LAHLOU. Prevalence and factors associated with Long COVID in Africa: systematic review and meta-analysis. PROSPERO 2023 CRD42023406305 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023406305

Review question: What are the frequencies and factors associated with post-COVID-19 symptoms in Africa?

93. Aisha Hill, Madelon Morford, Abrianna Jackson, Danielle Raso, Olga Varechtchouk. The association between underlying conditions, risk factors, risk markers and risk of post-COVID-19 symptoms ≥6 months after SARS-CoV-2 infection. PROSPERO 2023 CRD42023372909 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023372909

Review question: What underlying conditions, risk factors, and risk markers are associated with the presence of post-COVID-19 symptoms for ≥6 months post-resolution of infection?

94. Doreen Wolff, Karl Philipp Drewitz, Angela Ulrich, Doreen Siegels, Stefanie Deckert, Daniel Munblit, Jochen Schmitt, Christian Apfelbacher. Pre-existing allergic diseases as risk factors for Long-COVID symptoms: protocol for a systematic review. PROSPERO 2023 CRD42023391245 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023391245

Review question: Are pre-existing allergic diseases risk factors for Long-COVID symptoms?

95. Daniel Rayner, Justin Phung. Predictors of post-COVID-19 syndrome: a systematic review and meta-analysis. PROSPERO 2023 CRD42023400404 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023400404

Review question: In adults with confirmed or suspected COVID-19 infection, what are the predictors of post-COVID-19 syndrome at 12 weeks or more post-infection?

96. Daniel Rayner, Justin Phung. Predictors of post-COVID-19 syndrome in children and adolescents: a systematic review and meta-analysis. PROSPERO 2023 CRD42023402878 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023402878

Review question: In children and adolescents with confirmed or suspected COVID-19 infection, what are the predictors of post-COVID-19 syndrome at 12 weeks or more post-infection?

97. Erin Collins, Elizabeth Philippe, Christopher Gravel, Steven Hawken, Marc-André Langlois, Julian Little. Post COVID-19 condition onset and severity as functions of serological markers accounting for SARS-CoV-2 vaccination status and variants of concern: a rapid review of the evidence. PROSPERO 2023 CRD42023402978 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023402978

Review question: How are post-acute serological outcomes (e.g., non-response, early waning, levels of titres, and neutralizing antibody levels) associated with Post COVID-19 Condition (PCC) onset and severity?

98. Nicolas Hoertel, katayoun Rezaei, Marina Sánchez-Rico. Systematic review and meta analysis of the associations between known FIASMA medications and risks of clinical deterioration, hospitalization, ICU admission, mortality, and post-COVID conditions in patients with COVID-19. PROSPERO 2023 CRD42023354400 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023354400

Review question: Is the use of known FIASMA medications associated with reduced risks of clinical deterioration, hospitalization, mortality, and/or post-COVID conditions in patients with COVID-19?

99. Renatho Jesus, Solange Baraldi, Cristine Miron Stefani, Mihari Teixeira. Risk factors related to the occurrence of Post-COVID-19 Syndrome: a Systematic Review. PROSPERO 2023 CRD42023398600 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023398600

Review question: What are the main risk factors related to the persistence of signs and symptoms or the appearance of sequelae that, alone or in association, characterize the Post-COVID-19 syndrome in humans?

100. Sanam Alilou, Mehran Jaberinezhad, Parnian Shobeiri. Radiological findings as predictor for COVID-19 sequels: systematic review and meta-analyses. PROSPERO 2023 CRD42023393459 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023393459

Review question: In patients who recovered from COVID-19 infection (P), which radiological findings in the beginning of disease (I) can be predictor of fibrotic like changes (O) in post COVID-19 patients in compare with patients without fibrotic like changes (C)?

101. Warda A. Alrubasy, Mohammad J.J taha, Mohammad T. T. Abuawwad, Shams Khalid Sameer, Abdalla T. Abu-Zeinh, Hebahallah R Humaidan, Marwa Mahmoud. Are women with PCOS at higher risk of COVID19 complications? A systematic review. PROSPERO 2023 CRD42023371956 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023371956

Review question: Are women with PCOS disease at higher risk of COVID19 complications in comparison with normal healthy female?

Pathobiology and mechanisms (n=4)

Standard systematic reviews

102. Arman Shafiee, Mobin Teymouri. Brain-derived neurotrophic factor (BDNF) levels in COVID-19 and patients coping with Long COVID: a systematic review and meta-analysis. PROSPERO 2023 CRD42023413536 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023413536

Review questions: Is there a difference in the profile of brain-derived neurotrophic factor (BDNF) of the patients with COVID or Long COVID-19 compared to healthy individuals?

103. Emma Denneny, Joanna Porter, Sharenja Ratnakumar, Rebecca Evans, Robert Chapman. A systematic review of circulating proteins in long-COVID and correlation with clinical status.

PROSPERO 2023 CRD42023376190 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023376190

Review question: Do any circulating biomarkers correlate with persisting symptoms at more than 4 weeks in patients who have had confirmed SARS-CoV-2 infection?

104. Madhura Patil, Andrea Polli, Emma Richter, Jolien Hendrix. Epigenetic alterations in COVID-19 convalescent and post COVID-19 patients: a systematic review. PROSPERO 2023 CRD42023393690 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023393690

Review question: What are the epigenetic alterations occurring in COVID-19 convalescent and post COVID-19 patients compared to healthy individuals or acute COVID-19 patients or both?

105. Tilly Fox, Beverley Hunt, Robert Ariens, Greg Towers, Robert Lever, Paul Garner, Rebecca Kuehn. Amyloid fibrin(ogen) particles and post-COVID-19 syndrome: systematic review of laboratory studies. PROSPERO 2023 CRD42023402427 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023402427

Review question: What is the evidence that amyloid fibrin(ogen) particles are present in the post COVID-19 syndrome?

Diagnosis/monitoring tools (n=3)

Review of reviews (n=1)

106. Deanna Kaplan, Roman Palitsky, Shenita Peterson, Nicole Pozzo, Amit Shah, Jennifer Mascaro, Wilbur Lam, Rachel Patzer. Umbrella review of consumer health wearables for cardiovascular monitoring with relevance to Long COVID (Post-Acute Sequelae of SARS-CoV-2; PASC). PROSPERO 2023 CRD42023389361 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023389361

Review question: What is the review-level evidence for clinical validity of consumer health wearables for monitoring cardiovascular measurements of relevance to Post-Acute Sequelae of SARS-CoV-2 (PASC; also known as “Long COVID”)?

Standard systematic reviews (n=2)

107. Katharina Piontek, Ann-Kristin Baalmann, Christine Blome, Nina Stoletzki, Christian Apfelbacher. Quality of patient-reported outcome measures for post COVID-19 condition: A systematic review of instruments and measurement properties. PROSPERO 2023 CRD42023391238 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023391238

Review question: Our systematic review aims (i) to evaluate the quality of all existing patient-reported outcome measures (PROMs) for post COVID-19 condition, and (ii) to derive recommendations for the use of the identified PROMs in future research using the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) methodology.

108. Paula Lorgelly, Honor Browne, Andrew McCullough. Is there psychometric evidence to support the use of the EQ-5D in Long COVID? A systematic review. PROSPERO 2023 CRD42023385653 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023385653

Review question: What is the evidence of validity, reliability and responsiveness of the EQ-5D in Long COVID and is it an appropriate tool for measuring quality of life in individuals with Long COVID?

Economics/impact (n=1)

Standard systematic review

109. Gebeyehu DT, East L, Wark S, et al. Disability-adjusted life years (DALYs) based COVID-19 health impact assessment: a systematic review. BMC Public Health 2023;23:334. doi: https://dx.doi.org/10.1186/s12889-023-15239-0

Review question: The overarching objective of this systematic review was to identify the health burdens of COVID-19 and summarise the literature that can aid health regulators to make evidence-based decisions on COVID-19 mitigation strategies.

Experiences (n=1)

Standard systematic review

110. Marivic Valerio, Zipporah Dery, Gian Carlo Torres, Lucylynn Lizarondo. Perceived challenges of Long COVID patients following resumption of social roles: a qualitative systematic review protocol. PROSPERO 2023 CRD42023389764 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023389764

Review question: What are the challenges experienced by individuals who have Long COVID as they resume their social roles?

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 March 31, 2023

Date searched: 3rd April 2023

Records retrieved: 595

1 Post-Acute COVID-19 Syndrome/ (1844)
2 COVID-19 post-intensive care syndrome.mp. (5)
3 COVID-19/ or SARS-CoV-2/ (222750)
4 Syndrome/ (122194)
5 Survivors/ (29988)
6 4 or 5 (152062)
7 3 and 6 (934)
8 1 or 2 or 7 (2704)
9 ((long adj (covid$ or covid-19 or covid19 or coronavirus)) or longcovid$).ti,ab,kf,ot,bt. (2956)
10 ((post adj (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) or postcovid$).ti,ab,kf,ot,bt. (7212)
11 ((post acute or postacute) adj2 (covid$ or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)).ti,ab,kf,ot,bt. (675)
12 PASC.ti,ab,kf,ot,bt. (602)
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. (2080)
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. (282)
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. (1817)
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. (3298)
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. (114)
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. (230)
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. (2638)
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. (7441)
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. (2380)
22 or/9-21 (23837)
23 8 or 22 (24270)
24 systematic review.mp,pt. (295915)
25 search:.tw. (626414)
26 meta analysis.mp,pt. (270959)
27 review.pt. (3131711)
28 24 or 25 or 26 or 27 (3637337)
29 23 and 28 (3887)

30 qualitative review$.ti,ab,kf,ot,bt. (1703)
31 realist synthes$.ti,ab,kf,ot,bt. (362)
32 realist review$.ti,ab,kf,ot,bt. (631)
33 (meta-synthes$ or metasynthes$).ti,ab,kf,ot,bt. (1998)
34 (living adj2 (review$ or map$)).ti,ab,kf,ot,bt. (682)
35 pooled analysis.ti,ab,kf,ot,bt. (12198)
36 or/30-35 (17407)
37 23 and 36 (59)
38 29 or 37 (3892)
39 (202212$ or 202301$ or 202302$ or 202303$).dt. (557683)
40 38 and 39 (596)
41 exp animals/ not humans.sh. (5107928)
42 40 not 41 (595)

CINAHL Plus
via EBSCO https://www.ebsco.com/
Date range: Inception to 20230402
Date searched: 3rd April 2023
Records retrieved: 130

S1 (MH "Post-Acute COVID-19 Syndrome") 667
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*) 1,060
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*) 1,378
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)) 278
S5 TI PASC OR AB PASC 90
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)) 504
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)) 242
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)) 927
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)) 811
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)) 47
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)) 980
S13 TI (after N1 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) OR AB (after N1 (covid* or covid-19 or covid19 or coronavirus or SARS-CoV-2 or SARS-CoV2 or SARSCoV2 or SARSCoV-2)) 3,627
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)) 818
S15 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 8,834
S16 (MH "Systematic Review") 121,404
S17 (ZT "systematic review") 141,145
S18 (ZT "meta analysis") 51,792
S19 (MH "Meta Analysis") 69,135
S20 TI (meta-analys* or metaanaly*) OR AB (meta-analys* or metaanaly*) 104,926
S21 TI systematic* N1 review* OR AB systematic* N1 review* 148,279
S22 S16 OR S17 OR S18 OR S19 OR S20 OR S21 250,347
S23 (ZT "review") 371,769
S24 AB systematic* or AB methodologic* or AB quantitative* or AB research* or AB literature* or AB studies or AB trial* or AB effective* 2,932,776
S25 (S23 AND S24) 168,204
S26 S22 OR S25 409,822
S27 S15 AND S26 522
S28 (MH "Meta Synthesis") 2,123
S29 TI qualitative N1 review* OR AB qualitative N1 review* 3,763
S30 TI (realist N1 (review* or synthes*)) OR AB (realist N1 (review* or synthes*)) 534
S31 TI (meta-synthes* or metasynthes*) OR AB (meta-synthes* or metasynthes*) 1,748
S32 TI (living N2 (review* or map*)) AND (living N2 (review* or map*)) 212
S33 TI pooled N1 analys* OR AB pooled N1 analys* 8,082
S34 S28 OR S29 OR S30 OR S31 OR S32 OR S33 15,005
S35 S15 AND S34 26
S36 S27 OR S35 533
S37 EM 202212- 88,012
S38 (ZD "in process") 868,486
S39 S37 OR S38 956,498
S40 S36 AND S39 130

Cochrane Database of Systematic Reviews (CDSR)
via Wiley http://onlinelibrary.wiley.com/
Issue: 4 of 12, April 2023
Date searched: 3rd April 2023
Records retrieved: 0

#1 MeSH descriptor: [Post-Acute COVID-19 Syndrome] this term only 27

#2 MeSH descriptor: [COVID-19] this term only 4091

#3 MeSH descriptor: [SARS-CoV-2] this term only 2210

#4 MeSH descriptor: [Syndrome] this term only 6069

#5 MeSH descriptor: [Survivors] this term only 1516

#6 #2 or #3 4306

#7 #4 or #5 7581

#8 #6 and #7 39

#9 #1 or #8 66

#10 (long next (covid* or covid-19 or covid19 or coronavirus) or longcovid*):ti,ab,kw 214

#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 468

#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 869

#13 PASC:ti,ab,kw 46

#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 117

#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 28

#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 554

#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 171

#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 865

#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 365

#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 159

#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 213

#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 120

#23 {OR #10-#22} 1975

#24 #9 or #23 with Cochrane Library publication date Between Jan 2023 and Apr 2023, in Cochrane Reviews, Cochrane Protocols 0

Epistemonikos
https://www.epistemonikos.org/
Date searched: 3rd April 2023
Records retrieved: 382

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 04/01/2023 onwards, broad synthesis = 7, SR = 58

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 04/01/2023 onwards, broad synthesis = 1, SR = 9

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 04/01/2023 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 04/01/2023 onwards, broad synthesis = 0, SR = 20

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 04/01/2023 onwards, broad synthesis = 0, SR = 1

6. (title:("long term" OR "longer term" OR long-term OR longer-term) OR abstract:("long term" OR "longer term" OR long-term OR longer-term)) AND (title:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2) OR abstract:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2))
Limits = added to database from 04/01/2023 onwards, broad synthesis = 11, SR = 87

7. (title:(persist*) OR abstract:(persist*)) AND (title:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2) OR abstract:(covid OR covid-19 OR covid19 OR coronavirus OR "SARS CoV 2" OR SARS-CoV-2 OR SARSCoV2 OR "SARS CoV2" OR SARS-CoV2 OR "SARSCoV 2" OR SARSCoV-2))
Limits = added to database from 04/01/2023 onwards, broad synthesis = 9, SR = 28

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 04/01/2023 onwards, broad synthesis = 0, SR = 4

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 04/01/2023 onwards, broad synthesis = 2, SR = 22

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 04/01/2023 onwards, broad synthesis = 15, SR = 120

PROSPERO search strategy
https://www.crd.york.ac.uk/prospero/
Searched from 5th January to 4th April, 2023
Records identified: 270

#1 long COVID OR post COVID OR PASC

#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

#3 COVID OR COVID-19 OR COVID19 OR coronavirus OR SARS-CoV-2 OR SARS-CoV2 OR SARSCoV2 OR SARSCoV-2 OR 2019-nCoV

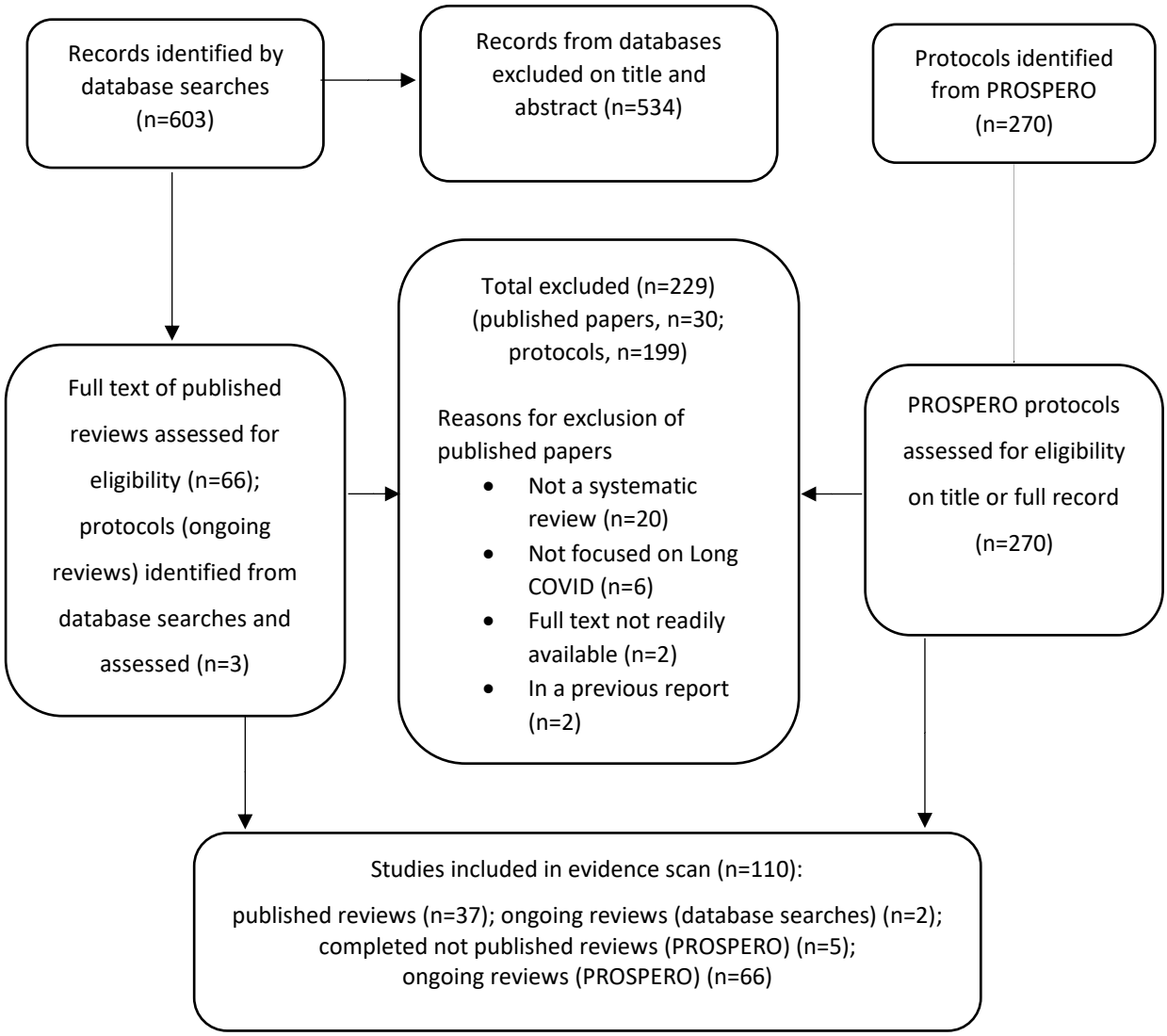
#4 #3 AND #2

#5 #1 OR #4

#6 * Where CD FROM *previous search date* TO *latest search date*

#7 #6 AND #5

Appendix 2: Flow of studies through the review



Appendix 3: summary of reports and updates

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

Report date	April 2023	January 2023	October 2022	July 2022	April 2022	November 2021
Period searched	Jan to Apr '23	Oct '22 to Jan '23	Jul '22 to Oct '22	Apr '22 to June'22	Nov '21 to Mar '22	Up to Nov '21
Primary focus by review type						
Published reviews	**37**	**50**	**29**	**28**	**54**	**51**
Treatment/rehabilitation	5	5	5	3	11	3
Treatment/prevention	2		2			
Prevention	1	2	1			1
Health and Social			1			
Symptoms/effects	21	31	19	22	38	47
Risk factors (RF); RF and prevalence	3	8		3		
RF, prevalence and treatment		1	1			
RF and prevention		1				
Pathobiology or mechanisms	3	2				
Risk factor/pathobiology					5	
Symptoms and mechanisms	1					
Treatment, prevention, symptoms, pathology, diagnosis	1					
Completed not published	**5**		**2**		**5**	**9**
Lived experience						1
Treatment/rehabilitation	2				1	1
Symptoms/effects	3		2		4	7
Ongoing reviews (new protocols)	**68**	**56**	**63**	**59**	**73**	**77**
Treatment/rehabilitation	27	33	24	12	17	15
Treatment/prevention	1		4			
Prevention		1		2	4	
Symptoms/effects and treatment		1				
Health and Social			1	1		
Symptoms/effects	18	13	30	31	47	59
Risk factors (RF); RF and prevalence	13	4		10		
RF, prevalence and prevention		1				
Pathobiology and mechanisms	4	3		3		
Risk factor/pathobiology			4		5	
Diagnosis/monitoring tools	3					
Health and economics	1					3
Experiences	1					

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