Systematic review

1. * Review title.

Give the title of the review in English

A living systematic review and meta-analysis of COVID-19 risk among people with asthma

2. Original language title.

For reviews in languages other than English, give the title in the original language. This will be displayed with the English language title.

3. * Anticipated or actual start date.

Give the date the systematic review started or is expected to start.

09/11/2020

4. * Anticipated completion date.

Give the date by which the review is expected to be completed.

29/11/2021

5. * Stage of review at time of this submission.

Tick the boxes to show which review tasks have been started and which have been completed. Update this field each time any amendments are made to a published record.

Reviews that have started data extraction (at the time of initial submission) are not eligible for inclusion in PROSPERO. If there is later evidence that incorrect status and/or completion date has been supplied, the published PROSPERO record will be marked as retracted.

This field uses answers to initial screening questions. It cannot be edited until after registration.

The review has not yet started: No

Review stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	No
Formal screening of search results against eligibility criteria	Yes	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

Provide any other relevant information about the stage of the review here.

6. * Named contact.

The named contact is the guarantor for the accuracy of the information in the register record. This may be any member of the review team.

Anthony Paulo Sunjaya

Email salutation (e.g. "Dr Smith" or "Joanne") for correspondence:

Dr Sunjaya

7. * Named contact email.

Give the electronic email address of the named contact.

a.sunjaya@unsw.edu.au

8. Named contact address

Give the full institutional/organisational postal address for the named contact.

1 King Street, Newtown, Sydney, New South Wales, Australia

9. Named contact phone number.

Give the telephone number for the named contact, including international dialling code.

0401017321

10. * Organisational affiliation of the review.

Full title of the organisational affiliations for this review and website address if available. This field may be completed as 'None' if the review is not affiliated to any organisation.

The George Institute for Global Health and University of New South Wales, Sydney

Organisation web address:

11. * Review team members and their organisational affiliations.

Give the personal details and the organisational affiliations of each member of the review team. Affiliation refers to groups or organisations to which review team members belong. **NOTE: email and country now MUST be entered for each person, unless you are amending a published record.**

Dr Anthony Paulo Sunjaya. George Institute for Global Health and University of New South Wales, Sydney
Dr Sabine Allida. The George Institute for Global Health and University of New South Wales, Sydney
Assistant/Associate Professor Gian Luca Di Tanna. The George Institute for Global Health and University of New South Wales, Sydney
Professor Christine Jenkins. The George Institute for Global Health and University of New South Wales, Sydney

12. * Funding sources/sponsors.

Details of the individuals, organizations, groups, companies or other legal entities who have funded or

sponsored the review.

Not applicable

Grant number(s)

State the funder, grant or award number and the date of award

13. * Conflicts of interest.

List actual or perceived conflicts of interest (financial or academic).

None

14. Collaborators.

Give the name and affiliation of any individuals or organisations who are working on the review but who are not listed as review team members. **NOTE: email and country must be completed for each person, unless you are amending a published record.**

15. * Review question.

State the review question(s) clearly and precisely. It may be appropriate to break very broad questions down into a series of related more specific questions. Questions may be framed or refined using PI(E)COS or similar where relevant.

Are people with asthma at a higher risk of being infected, hospitalised or of poor clinical outcomes due to COVID-19 infection?

16. * Searches.

State the sources that will be searched (e.g. Medline). Give the search dates, and any restrictions (e.g. language or publication date). Do NOT enter the full search strategy (it may be provided as a link or attachment below.)

A systematic search of electronic databases such as PubMed Litcovid (https://www.ncbi.nlm.nih.gov/research/coronavirus/), Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Databases of Systematic Reviews, and MEDLINE; As part of an existing systematic review registered under PROSPERO ID: CRD42020185673), a subsequent update was conducted on 9 November 2020 through PubMed Litcovid. Subsequent searches will be done based on a joint decision by the study team with a final review once the COVID-19 pandemic officially ends according to the World Health Organization.

(CENTRAL), Cochrane Databases of Systematic Reviews, and MEDLINE; As part of an existing systematic review registered under PROSPERO ID: CRD42020185673), a subsequent update was conducted on 9 November 2020 through PubMed Litcovid. Subsequent searches will be done based on a joint decision by the study team with a final review once the COVID-19 pandemic officially ends according to the World Health Organization.

17. URL to search strategy.

Upload a file with your search strategy, or an example of a search strategy for a specific database, (including the keywords) in pdf or word format. In doing so you are consenting to the file being made publicly accessible. Or provide a URL or link to the strategy. Do NOT provide links to your search **results**.

https://www.crd.york.ac.uk/PROSPEROFILES/222303_STRATEGY_20201123.pdf

Alternatively, upload your search strategy to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Do not make this file publicly available until the review is complete

18. * Condition or domain being studied.

Give a short description of the disease, condition or healthcare domain being studied in your systematic review.

Confirmed COVID-19 cases based on rt-PCR with pre-existing asthma diagnosis.

19. * Participants/population.

Specify the participants or populations being studied in the review. The preferred format includes details of both inclusion and exclusion criteria.

Patients with confirmed COVID-19 based on rt-PCR with pre-existing asthma diagnosis.

20. * Intervention(s), exposure(s).

Give full and clear descriptions or definitions of the interventions or the exposures to be reviewed. The preferred format includes details of both inclusion and exclusion criteria.

Being infected with COVID-19.

21. * Comparator(s)/control.

Where relevant, give details of the alternatives against which the intervention/exposure will be compared (e.g. another intervention or a non-exposed control group). The preferred format includes details of both inclusion and exclusion criteria.

Patients with confirmed COVID-19 based on rt-PCR with no pre-existing asthma diagnosis.

22. * Types of study to be included.

Give details of the study designs (e.g. RCT) that are eligible for inclusion in the review. The preferred format includes both inclusion and exclusion criteria. If there are no restrictions on the types of study, this should be stated.

All studies with a comparator/control group will be included. The study designs eligible are interventional studies and case control studies.

We will exclude:

• Laboratory studies on the mechanisms of susceptibility to acquisition and severity of COVID-19.

• Studies focusing only on the pathophysiology of COVID-19 in asthma.

23. Context.

Give summary details of the setting or other relevant characteristics, which help define the inclusion or exclusion criteria.

24. * Main outcome(s).

Give the pre-specified main (most important) outcomes of the review, including details of how the outcome is defined and measured and when these measurement are made, if these are part of the review inclusion criteria.

• Risk of infection for people with asthma.

• Risk of severe outcomes for people with asthma (treated in intensive care, requiring ventilators).

• Risk of death for people with asthma.

* Measures of effect

Please specify the effect measure(s) for you main outcome(s) e.g. relative risks, odds ratios, risk difference,

and/or 'number needed to treat.

The outcome measures will be as relative risks or odds ratios.

25. * Additional outcome(s).

List the pre-specified additional outcomes of the review, with a similar level of detail to that required for main outcomes. Where there are no additional outcomes please state ‘None’ or ‘Not applicable’ as appropriate to the review

• Evidence for asthma treatments in vulnerability to or protection against COVID-19 complications.

* Measures of effect

Please specify the effect measure(s) for you additional outcome(s) e.g. relative risks, odds ratios, risk difference, and/or 'number needed to treat.

The outcome measures will be as relative risks or odds ratios.

26. * Data extraction (selection and coding).

Describe how studies will be selected for inclusion. State what data will be extracted or obtained. State how this will be done and recorded.

The review will be conducted according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA).

Stage 1: Titles and abstracts will be screened by two reviewers independently, in duplicate to determine whether retrieved studies have met the inclusion criteria using Rayyan. Studies will be excluded if the title or abstract does not meet the inclusion criteria, and reasons for exclusion will be recorded. If necessary, a third reviewer will manage disagreements in title and abstract consensus checks that have not been resolved by initial discussion. If it is not possible to determine whether the studies meet the inclusion criteria from the title and/or abstract, it will be marked for a full paper review.

Stage 2: The full paper will be obtained for studies that appear to have met the inclusion criteria or where a decision could not be made from the title and/or abstract alone, for a detailed review against inclusion criteria. Full-texts will be independently assessed for eligibility by the two reviewers. Discrepancies will be resolved by an initial discussion or with a third reviewer, if required. Studies that are excluded on retrieval of the full text will be recorded, accompanied by a justification for exclusion. A PRISMA flowchart will be created to demonstrate the different phases of this process. Any missing data will be requested from study authors. Qualtrics XM will be used to extract data from the included studies to assist in study quality and evidence synthesis. Extracted information will include: study characteristics (aim/objective, study design, eligibility criteria, and recruitment procedures), participant characteristics, intervention, comparator, outcomes (primary and secondary), and information required for assessment of risk of bias. Extraction will be completed by one reviewer (AS or SA) and checked="checked" value="1" by another reviewer independently. A third reviewer will be consulted if needed.

27. * Risk of bias (quality) assessment.

State which characteristics of the studies will be assessed and/or any formal risk of bias/quality assessment tools that will be used.

The methodological quality of included studies will be assessed using the Newcastle-Ottawa Scale. The domains reviewed include the selection of study groups, comparability of groups and the ascertainment of exposure or outcomes for cohort and case-control studies, respectively. Cross-sectional studies will be assessed using the scale for cohort studies.

The Newcastle Ottawa scale uses a star system with a maximum of 9 stars across all three domains.

Disagreements in the assessment of the risk of bias will be resolved through consensus or with a third reviewer if needed.

28. * Strategy for data synthesis.

Describe the methods you plan to use to synthesise data. This **must not be generic text** but should be **specific to your review** and describe how the proposed approach will be applied to your data. If meta-analysis is planned, describe the models to be used, methods to explore statistical heterogeneity, and software package to be used.

Depending on data availability, we plan for the prevalence and means of individual studies obtained to be pooled using a random-effects model. Similarly, risk ratios (or odds ratios) and mean differences will also be calculated for dichotomous data (such as being infected with COVID-19, hospitalization, ICU admission, ventilator use, mortality) and continuous data (such as viral load, days to recovery) respectively with 95% confidence intervals. All pooled results will be presented in the form of forest plots. Analyses will be performed using Review Manager 5.3 and Stata version 16.0.

Assessment of heterogeneity between studies will be conducted using the ?² test and the observed value of the I² test. If the I² test is moderate to high (40%), we will investigate the possible causes of heterogeneity.

Sensitivity analyses will be conducted to assess the robustness of the pooled estimates through (i) restricting studies to those with low or moderate risk of bias and (ii) restricting studies to only those published.

If a meta-analysis is not possible, the results will be presented in the form of narrative synthesis.

29. * Analysis of subgroups or subsets.

State any planned investigation of ‘subgroups’. Be clear and specific about which type of study or participant will be included in each group or covariate investigated. State the planned analytic approach.

Other sensitivity analysis will be conducted as follows: Additional analysis will be conducted with the removal of studies with high risk of bias.

• Analysis based on demographic factors such as age, gender, and smoking.

• Analysis based on asthma severity.

• Analysis based on participants' region of origin.

30. * Type and method of review.

Select the type of review, review method and health area from the lists below.

Type of review

Cost effectiveness
No

Diagnostic

No

Epidemiologic
Yes

Individual patient data (IPD) meta-analysis
No

Intervention
Yes

Meta-analysis
Yes

Methodology
No

Narrative synthesis
No

Network meta-analysis
No

Pre-clinical
No

Prevention
Yes

Prognostic
Yes

Prospective meta-analysis (PMA)
No

Review of reviews
No

Service delivery
No

Synthesis of qualitative studies
No

Systematic review
Yes

Other
No

Health area of the review

Alcohol/substance misuse/abuse
No

Blood and immune system
No

Cancer
No

Cardiovascular
No

Care of the elderly
No

Child health
No

Complementary therapies
No

COVID-19
Yes

For COVID-19 registrations please tick all categories that apply. Doing so will enable your record to appear in area-specific searches

Chinese medicine
Diagnosis
Epidemiological
Genetics
Health impacts
Immunity
Long COVID
Mental health
PPE
Prognosis
Public health intervention
Rehabilitation
Service delivery
Transmission
Treatments
Vaccines
Other

Crime and justice
No

Dental
No

Digestive system
No

Ear, nose and throat
No

Education
No

Endocrine and metabolic disorders
No

Eye disorders
No

General interest
No

Genetics
No

Health inequalities/health equity

No

Infections and infestations
No

International development
No

Mental health and behavioural conditions
No

Musculoskeletal
No

Neurological
No

Nursing
No

Obstetrics and gynaecology
No

Oral health
No

Palliative care
No

Perioperative care
No

Physiotherapy
No

Pregnancy and childbirth
No

Public health (including social determinants of health)
No

Rehabilitation
No

Respiratory disorders
No

Service delivery
No

Skin disorders
No

Social care
No

Surgery
No

Tropical Medicine
No

Urological
No

Wounds, injuries and accidents
No

Violence and abuse
No

31. Language.

Select each language individually to add it to the list below, use the bin icon to remove any added in error.
English

There is not an English language summary

32. * Country.

Select the country in which the review is being carried out. For multi-national collaborations select all the countries involved.

Australia

33. Other registration details.

Name any other organisation where the systematic review title or protocol is registered (e.g. Campbell, or The Joanna Briggs Institute) together with any unique identification number assigned by them. If extracted data will be stored and made available through a repository such as the Systematic Review Data Repository (SRDR), details and a link should be included here. If none, leave blank.

34. Reference and/or URL for published protocol.

If the protocol for this review is published provide details (authors, title and journal details, preferably in Vancouver format)

Add web link to the published protocol.

Or, upload your published protocol here in pdf format. Note that the upload will be publicly accessible.

No I do not make this file publicly available until the review is complete

Please note that the information required in the PROSPERO registration form must be completed in full even if access to a protocol is given.

35. Dissemination plans.

Do you intend to publish the review on completion?

Yes

Give brief details of plans for communicating review findings.?

36. Keywords.

Give words or phrases that best describe the review. Separate keywords with a semicolon or new line. Keywords help PROSPERO users find your review (keywords do not appear in the public record but are included in searches). Be as specific and precise as possible. Avoid acronyms and abbreviations unless these are in wide use.

asthma; COVID-19; hospitalisation; ICU; ventilator; mortality; humans; severe acute respiratory syndrome coronavirus 2

37. Details of any existing review of the same topic by the same authors.

If you are registering an update of an existing review give details of the earlier versions and include a full bibliographic reference, if available.

This is an update of an existing review titled "Impact of COVID-19 on people with asthma" (PROSPERO ID: CRD42020185673).

38. * Current review status.

Update review status when the review is completed and when it is published.New registrations must be ongoing so this field is not editable for initial submission.
Please provide anticipated publication date

Review_Ongoing

39. Any additional information.

Provide any other information relevant to the registration of this review.

40. Details of final report/publication(s) or preprints if available.

Leave empty until publication details are available OR you have a link to a preprint (NOTE: this field is not editable for initial submission). List authors, title and journal details preferably in Vancouver format.

Give the link to the published review or preprint.