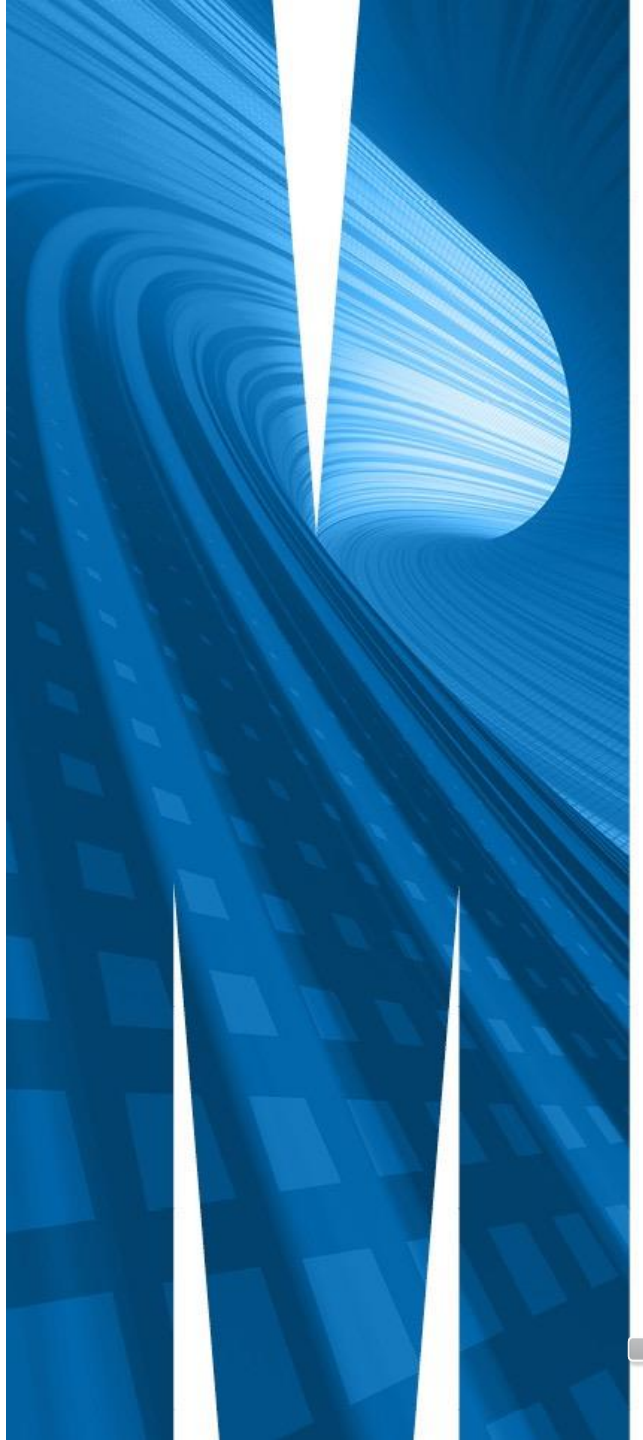
MONASH University

PRISMA 2020: changes, implications & opportunities for health and medical librarians

Matthew Page

School of Public Health and Preventive Medicine
Monash University

UK University Health and Medical Librarians Group Summer Forum, 17 June 2021



Funding and Declarations

Funding

I am supported by an Australian Research Council Discovery Early Career Researcher Award

Declarations

I co-led the PRISMA 2020 development group, and co-authored the PRISMA-Search extension, but have no financial conflict of interest in relation to this presentation

Acknowledgement

Steve McDonald, Julie Glanville, James Thomas

Outline

1. Rationale and development of PRISMA 2020
2. Overview of PRISMA 2020
3. PRISMA 2020 items
    a) Information sources
    b) Search strategy
    c) Selection process
    d) Flow diagram

Reporting of systematic reviews (SRs)

Users of SRs need to know what authors did and what they found

Clear reporting of SRs enables:

- Replication of SR methods
- Assessment of the trustworthiness of SR findings
- Assessment of the applicability of findings

Reporting versus conduct (see ROBIS and AMSTAR-2 for tools to assess conduct)

Andrew Booth
@AndrewB007h

PRISMA = Please Realise I Screened Many Articles

Ruth Garside 🇪🇺 💙 @Ru... · Oct 11, 2018

Replying to @AndrewB007h

I think it's a cry for help "20K HITS - LOOK HOW TIRED I AM!"

8:39 PM · Oct 11, 2018 · Twitter for Android

12 Retweets **4** Quote Tweets **56** Likes

PRISMA statement

PRISMA stands for Preferred Reporting Items for Systematic Reviews and Meta-Analyses

Minimum set of 27 items for reporting

Published in 2009, cited >60,000 times

Endorsed by >400 journals

16 extensions

Moher et al. BMJ 2009;339:b2535.

MONASH University

Rationale for updating PRISMA

Several changes over the last 10 years in:

- Methods available for SRs (e.g. automation, alternative synthesis methods, risk of bias tools)
- Terminology
- Avenues for disseminating SR reports and their materials

Poor reporting of several items persists (Page 2016 PLoS Med)

Rearranging layout and rephrasing items may increase clarity

Literature review

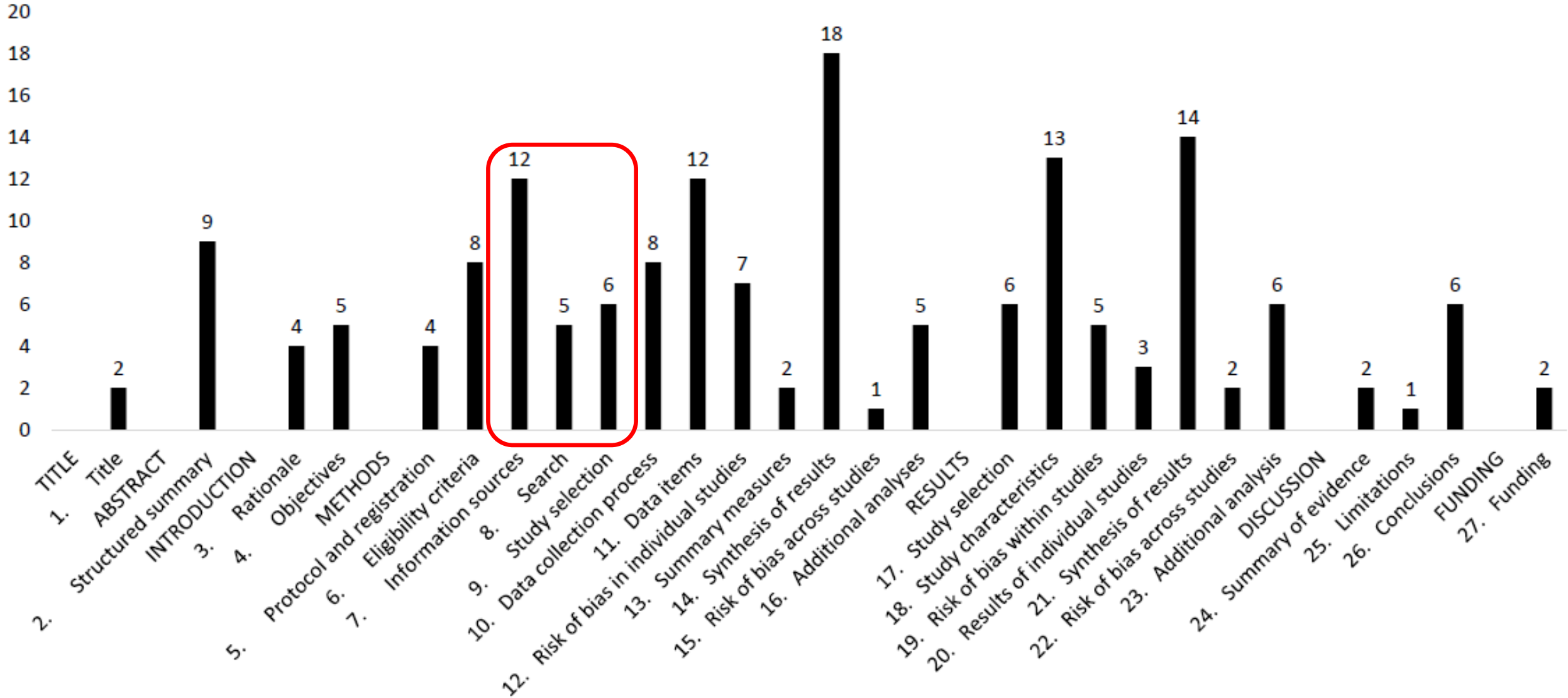
Selective review of 60 guidance documents

- PRISMA checklist, E&E and all extensions
- Other reporting guidelines for SRs
- Conduct manuals for SRs
- Tools for assessing quality/risk of bias in SRs
- Tailored checklists to evaluate reporting quality of SRs

Collated 221 unique reporting items

Page et al. J Clin Epidemiol 2020;118:60-68.

Number of items not captured by PRISMA 2009



Survey

110 respondents from 22 countries

>66% recommended:

- keeping 6 existing items as they are
- modifying 15 existing items
- including 5 of 12 potential new items

Total of 150 pages of free-text comments

PRISMA 2020 Consensus Meeting

Held 13-14 September 2018 in Edinburgh, UK

21 attendees from 7 countries

Presented data from literature review and survey

Discussed as a full group:

- proposed modifications to existing 27 items
- addition of new items
- dissemination and implementation

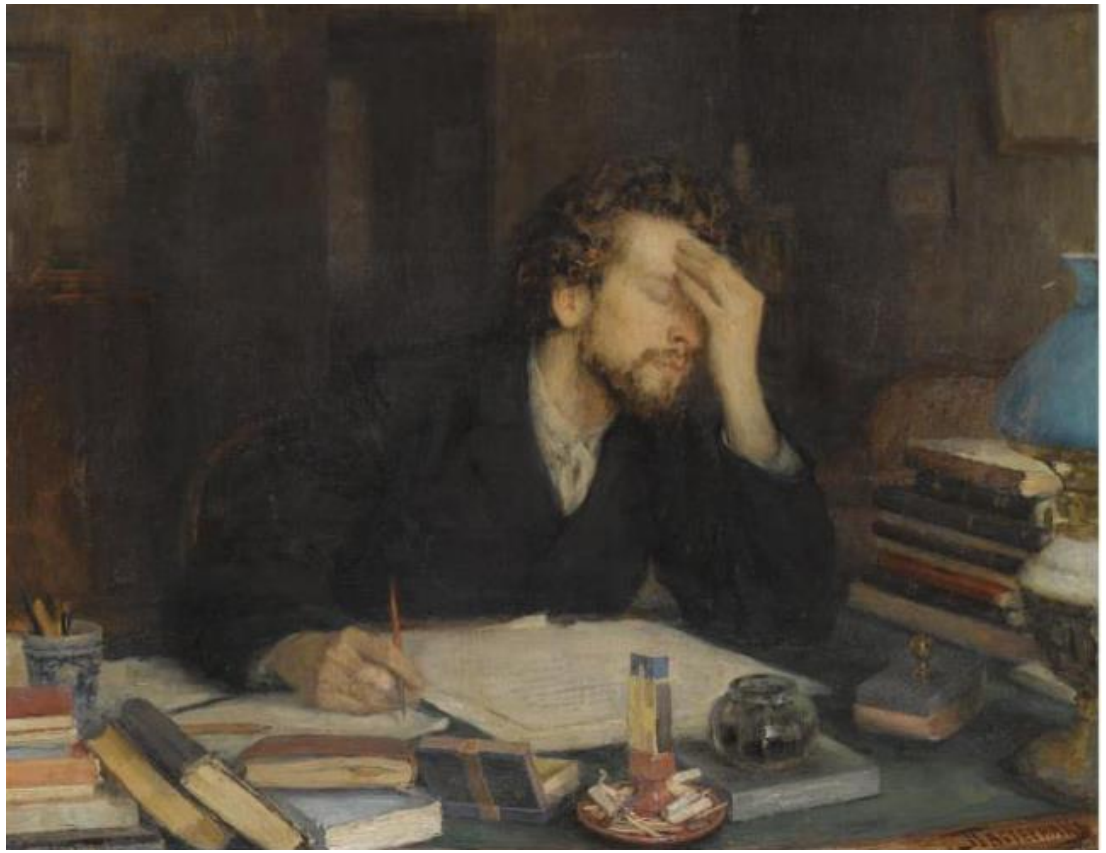
Drafting PRISMA 2020

Initial draft of checklist, E&E and flow diagram in Dec 2018

6 rounds of feedback from co-authors in 2019 and 2020

15 review authors provided feedback on the beta version in Apr 2020

Preprints uploaded to MetaArXiv in Sep 2020



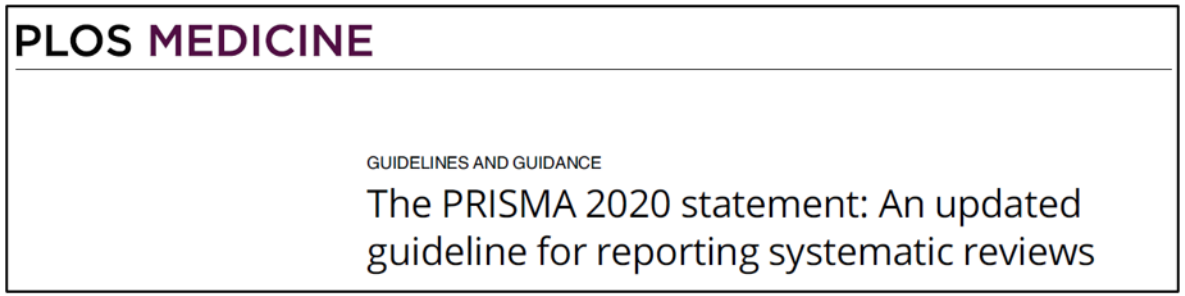
PRISMA 2020 papers


RESEARCH METHODS AND REPORTING

The PRISMA 2020 statement: an updated guideline for reporting systematic reviews

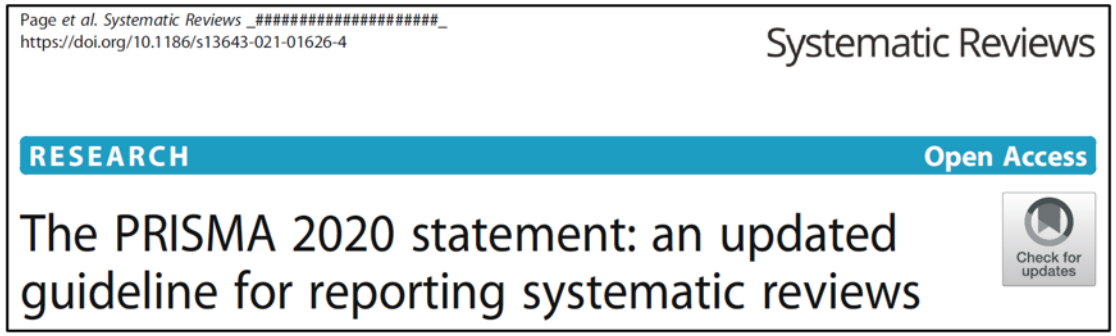

RESEARCH METHODS AND REPORTING

PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews


PLOS MEDICINE

GUIDELINES AND GUIDANCE

The PRISMA 2020 statement: An updated guideline for reporting systematic reviews

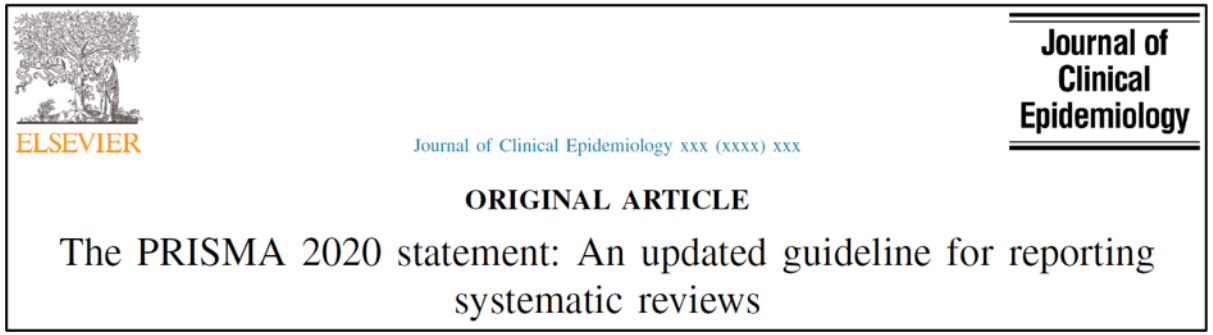

Page *et al. Systematic Reviews* _####################_
https://doi.org/10.1186/s13643-021-01626-4

Systematic Reviews

RESEARCH Open Access

The PRISMA 2020 statement: an updated guideline for reporting systematic reviews

Check for updates


ELSEVIER

Journal of Clinical Epidemiology xxx (xxxx) xxx

Journal of Clinical Epidemiology

ORIGINAL ARTICLE

The PRISMA 2020 statement: An updated guideline for reporting systematic reviews


ELSEVIER

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.elsevier.com/locate/ijsu

Guideline

The PRISMA 2020 statement: An updated guideline for reporting systematic reviews

MONASH University

Overview of PRISMA 2020

MONASH University

PRISMA 2020 overview

7 sections

Section	No. items
Title	1
Abstract	1
Introduction	2
Methods	11
Results	7
Discussion	1
Other Information	4

27 items (some have sub-items)

Key changes in PRISMA 2020

All checklist items have undergone some revision

- Use of more inclusive wording re different methods
- Re-ordering of some items for better flow
- Splitting of some current long items into sub-items

A small number of new items have been introduced

Elaboration extensively revised (new examples sought)

New PRISMA flow diagram templates

Key changes in PRISMA 2020

More explicit request to report:

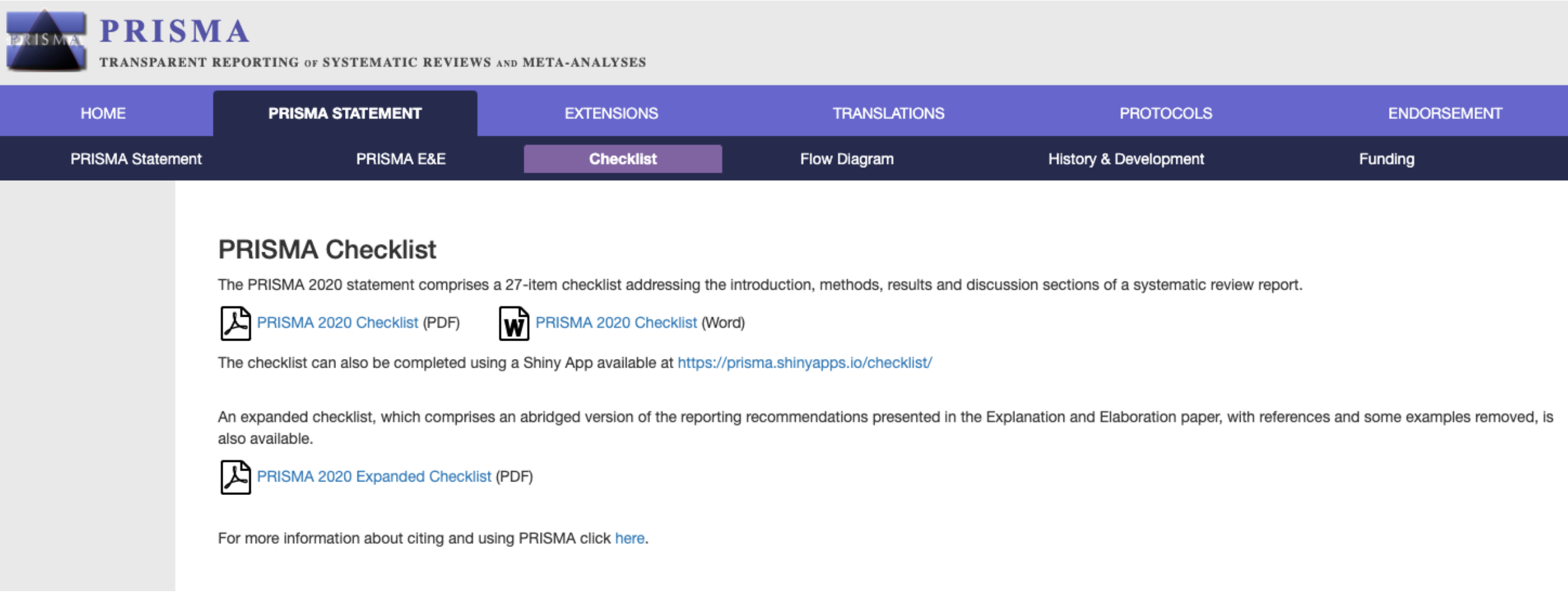
- full search strategies for *all* databases, registers, websites
- automation tools used (e.g. for study selection)
- how outcomes were defined and which results were sought
- characteristics and risk of bias among studies *contributing to each synthesis*
- protocol amendments
- conflicts of interest of review authors

Key changes in PRISMA 2020

New items (and sub-items) on:

- synthesis of results:
  - criteria and processes used to group studies
  - methods to prepare data for synthesis
  - tabulation and visual display methods
  - meta-analysis and other statistical synthesis methods
- assessing certainty in the body of evidence
- availability of data, statistical code and other materials

prisma-statement.org/PRISMAStatement



PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	
Study characteristics	17	Cite each included study and present its characteristics.	
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	
	23b	Discuss any limitations of the evidence included in the review.	
	23c	Discuss any limitations of the review processes used.	
	23d	Discuss implications of the results for practice, policy, and future research.	
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	
Competing interests	26	Declare any competing interests of review authors.	
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	

Layout of E&E

Explanation of why the item should be reported

List of reporting recommendations

Exemplar

Objectives

Item 4. Provide an explicit statement of the objective(s) or question(s) the review addresses

Explanation: An explicit and concise statement of the review objective(s) or question(s) will help readers understand the scope of the review and assess whether the methods used in the review (such as eligibility criteria, search methods, data items, and the comparisons used in the synthesis) adequately address the objective(s). Such statements may be written in the form of objectives ("the objectives of the review were to examine the effects of…") or as questions ("what are the effects of…?").[31]

Essential elements

- Provide an explicit statement of all objective(s) or question(s) the review addresses, expressed in terms of a relevant question formulation framework (see Booth et al[33] and Munn et al[34] for various frameworks).
- If the purpose is to evaluate the effects of interventions, use the Population, Intervention, Comparator, Outcome (PICO) framework or one of its variants to state the comparisons that will be made.

Example of item 4 of PRISMA 2020 checklist

"Objectives: To evaluate the benefits and harms of down-titration (dose reduction, discontinuation, or disease activity-guided dose tapering) of anti-tumour necrosis factor-blocking agents (adalimumab, certolizumab pegol, etanercept, golimumab, infliximab) on disease activity, functioning, costs, safety, and radiographic damage compared with usual care in people with rheumatoid arthritis and low disease activity."[170]

PRISMA 2020 items

Item 6	Information sources
Item 7	Search strategy
Item 8	Selection process
Item 16a	Flow diagram

MONASH University

INFORMATION SOURCES

Item 6

Specify **all databases, registers, websites, organisations, reference lists, and other sources** searched or consulted to identify studies. Specify the **date** when each source was last searched or consulted.

- allows readers to assess the completeness and currency of the systematic review
- facilitates updating

What's new

- more explicit about the "what" and "when" of each source searched
- for **cited or citing reference searches**, specify the bibliographic details of the reports to which citation searching was applied, the citation index or platform used and the date the citation searching was done.

SEARCH STRATEGY

Item 7

Present the **full search strategies** for all databases, registers, and websites, including any filters and limits used

What's new

- report **all** search strategies report the search terms used to search any sources other than bibliographic databases (e.g. trials registers, the web)
- description of the search strategy development process (e.g. text mining tools to identify keywords, etc.), or any processes used to validate (e.g. capture-recapture) or peer review the search strategies (e.g. PRESS checklist)
- report if tools were used to automatically translate search strings for one database to another (e.g. Polyglot Search Translator)
- description of conceptual structure of search if not based on PICO-style approach

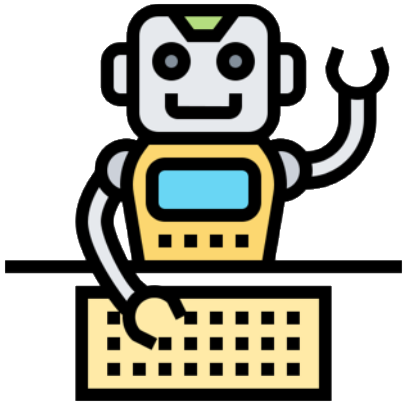
STUDY SELECTION PROCESS

Item 8

Specify the methods used to decide whether a study met the inclusion criteria of the review, including **how many reviewers screened each record** and each report retrieved, whether they worked **independently**, and, if applicable, details of **automation tools** used in the process.

Reviewer screening

Priority screening



Machine classifiers

Crowdsourcing

Essential elements for systematic reviews regardless of the selection processes used

- report how many reviewers screened each record (title/abstract) and each report retrieved
- whether multiple reviewers worked independently (that is, were unaware of each other's decisions) at each stage of screening or not (for example, records screened by one reviewer and exclusions verified by another)
- processes used to resolve disagreements between screeners (for example, referral to a third reviewer or by consensus).
- Report any processes used to obtain or confirm relevant information from study investigators.
- If abstracts or articles required translation into another language to determine their eligibility, report how these were translated (for example, by asking a native speaker or by using software programs).

Essential elements for systematic reviews using automation tools in the selection process

- Report how automation tools were integrated within the overall study selection process
- Externally derived machine learning classifiers
    - reference or URL to the version used
    - report the number eliminated in the PRISMA flow diagram as “Records marked as ineligible by automation tools.”
- Internally derived classifiers: how trained (any validation) and how applied
- Priority screening: state the software used and provide details of any screening rules applied

PRISMA 2020 expanded checklist

Note: This expanded checklist details elements recommended for reporting for each PRISMA 2020 item. Non-italicized elements are considered 'essential' and should be reported in the main report or as supplementary material for all systematic reviews (except for those preceded by "If…", which should only be reported where applicable). Elements written in italics are 'additional', and while not essential, provide supplementary information that may enhance the completeness and usability of systematic review reports. Note that elements presented here are an abridged version of those presented in the explanation and elaboration paper (BMJ 2021;372:n160), with references and some examples removed. Consulting the explanation and elaboration paper is recommended if further clarity or information is required.

Section and Topic	Item #	Elements recommended for reporting
TITLE		
TITLE	1	• Identify the report as a systematic review in the title. • Report an informative title that provides key information about the main objective or question the review addresses (e.g. the population(s) and intervention(s) the review addresses). • *Consider providing additional information in the title, such as the method of analysis used, the designs of included studies, or an indication that the review is an update of an existing review, or a continually updated ("living") systematic review.*
ABSTRACT		
ABSTRACT	2	• Report an abstract addressing each item in the PRISMA 2020 for Abstracts checklist.
INTRODUCTION		
RATIONALE	3	• Describe the current state of knowledge and its uncertainties. • Articulate why it is important to do the review. • If other systematic reviews addressing the same (or a largely similar) question are available, explain why the current review was considered necessary. If the review is an update or replication of a particular systematic review, indicate this and cite the previous review. • If the review examines the effects of interventions, also briefly describe how the intervention(s) examined might work. • *If there is complexity in the intervention or context of its delivery (or both) (e.g. multi-component interventions, equity considerations), consider presenting a logic model to visually display the hypothesised relationship between intervention components and outcomes.*
OBJECTIVES	4	• Provide an explicit statement of all objective(s) or question(s) the review addresses, expressed in terms of a relevant question formulation framework. • If the purpose is to evaluate the effects of interventions, use the Population, Intervention, Comparator, Outcome (PICO) framework or one of its variants, to state the comparisons that will be made.
METHODS		
ELIGIBILITY CRITERIA	5	• Specify all study characteristics used to decide whether a study was eligible for inclusion in the review, that is, components described in the PICO framework or one of its variants, and other characteristics, such as eligible study design(s) and setting(s), and minimum duration of follow-up. • Specify eligibility criteria with regard to report characteristics, such as year of dissemination, language, and report status (e.g. whether reports, such as unpublished manuscripts and conference abstracts, were eligible for inclusion). • Clearly indicate if studies were ineligible because the outcomes of interest were not measured, or ineligible because the results for the outcome of interest were not reported. • Specify any groups used in the synthesis (e.g. intervention, outcome and population groups) and link these to the comparisons specified in the objectives (item #4). • *Consider providing rationales for any notable restrictions to study eligibility.*

Section and Topic	Item #	Elements recommended for reporting
INFORMATION SOURCES	6	• Specify the date when each source (e.g. database, register, website, organisation) was last searched or consulted. • If bibliographic databases were searched, specify for each database its name (e.g. MEDLINE, CINAHL), the interface or platform through which the database was searched (e.g. Ovid, EBSCOhost), and the dates of coverage (where this information is provided). • If study registers, regulatory databases and other online repositories were searched, specify the name of each source and any date restrictions that were applied. • If websites, search engines or other online sources were browsed or searched, specify the name and URL of each source. • If organisations or manufacturers were contacted to identify studies, specify the name of each source. • If individuals were contacted to identify studies, specify the types of individuals contacted (e.g. authors of studies included in the review or researchers with expertise in the area). • If reference lists were examined, specify the types of references examined (e.g. references cited in study reports included in the systematic review, or references cited in systematic review reports on the same or similar topic). • If cited or citing reference searches (also called backward and forward citation searching) were conducted, specify the bibliographic details of the reports to which citation searching was applied, the citation index or platform used (e.g. Web of Science), and the date the citation searching was done. • If journals or conference proceedings were consulted, specify of the names of each source, the dates covered and how they were searched (e.g. handsearching or browsing online).
SEARCH STRATEGY	7	• Provide the full line by line search strategy as run in each database with a sophisticated interface (such as Ovid), or the sequence of terms that were used to search simpler interfaces, such as search engines or websites. • Describe any limits applied to the search strategy (e.g. date or language) and justify these by linking back to the review's eligibility criteria. • If published approaches, including search filters designed to retrieve specific types of records or search strategies from other systematic reviews, were used, cite them. If published approaches were adapted, for example if search filters are amended, note the changes made. • If natural language processing or text frequency analysis tools were used to identify or refine keywords, synonyms or subject indexing terms to use in the search strategy, specify the tool(s) used. • If a tool was used to automatically translate search strings for one database to another, specify the tool used. • If the search strategy was validated, for example by evaluating whether it could identify a set of clearly eligible studies, report the validation process used and specify which studies were included in the validation set. • If the search strategy was peer reviewed, report the peer review process used and specify any tool used such as the Peer Review of Electronic Search Strategies (PRESS) checklist. • If the search strategy structure adopted was not based on a PICO-style approach, describe the final conceptual structure and any explorations that were undertaken to achieve it.
SELECTION PROCESS	8	*Recommendations for reporting regardless of the selection processes used:* • Report how many reviewers screened each record (title/abstract) and each report retrieved, whether multiple reviewers worked independently at each stage of screening or not, and any processes used to resolve disagreements between screeners. • Report any processes used to obtain or confirm relevant information from study investigators. • If abstracts or articles required translation into another language to determine their eligibility, report how these were translated. *Recommendations for reporting in systematic reviews using automation tools in the selection process:* • Report how automation tools were integrated within the overall study selection process.

PRISMA Flow diagram

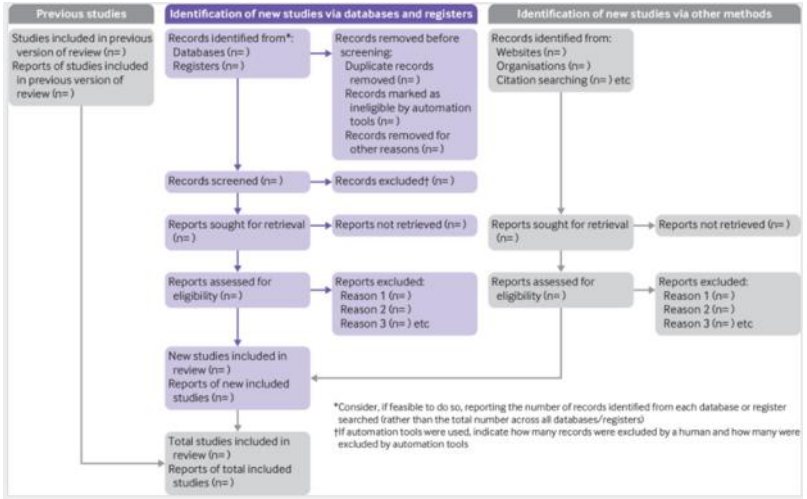
Item 16a

Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram

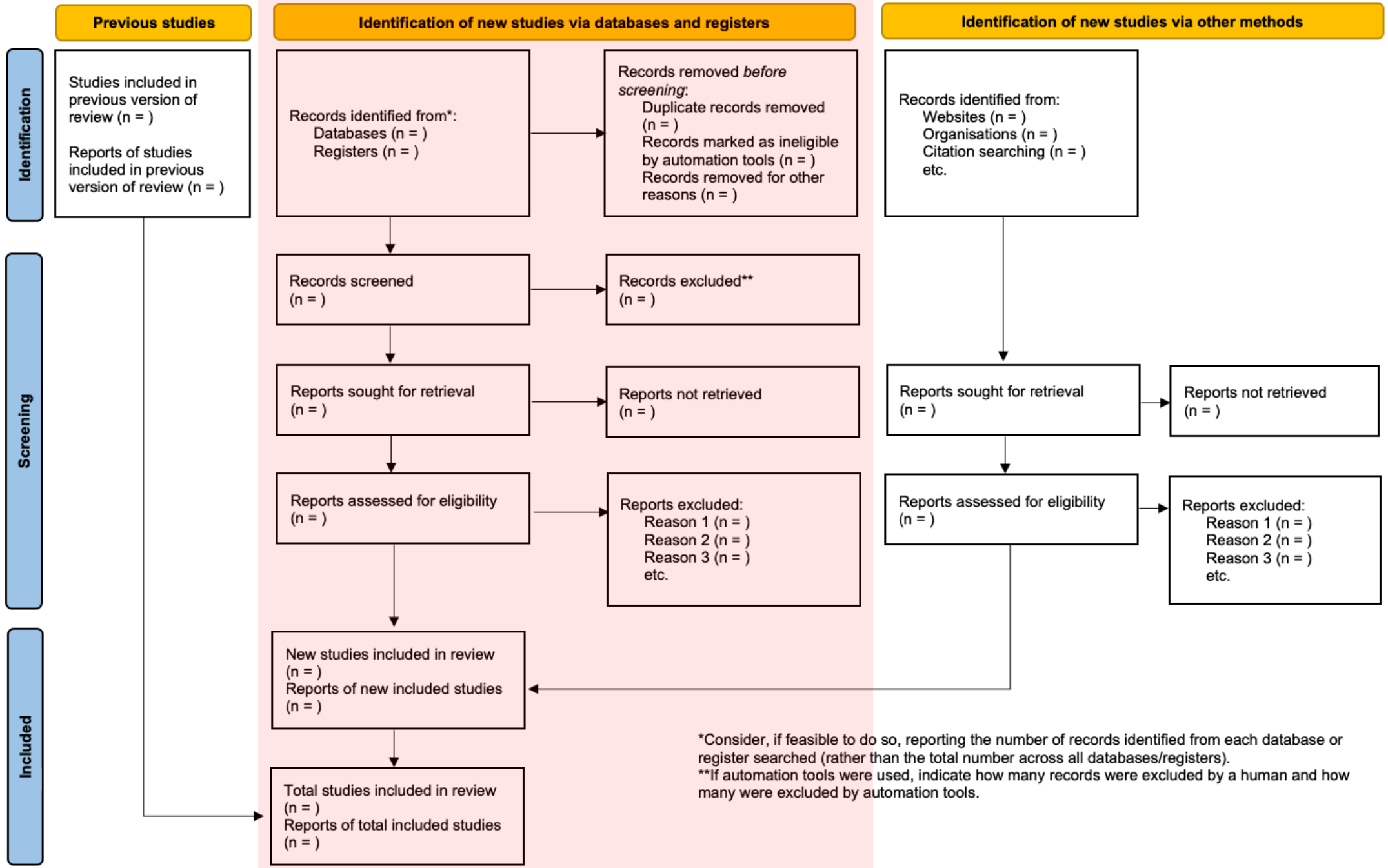
- improve replication
- help estimate resource requirements for updates

What's new

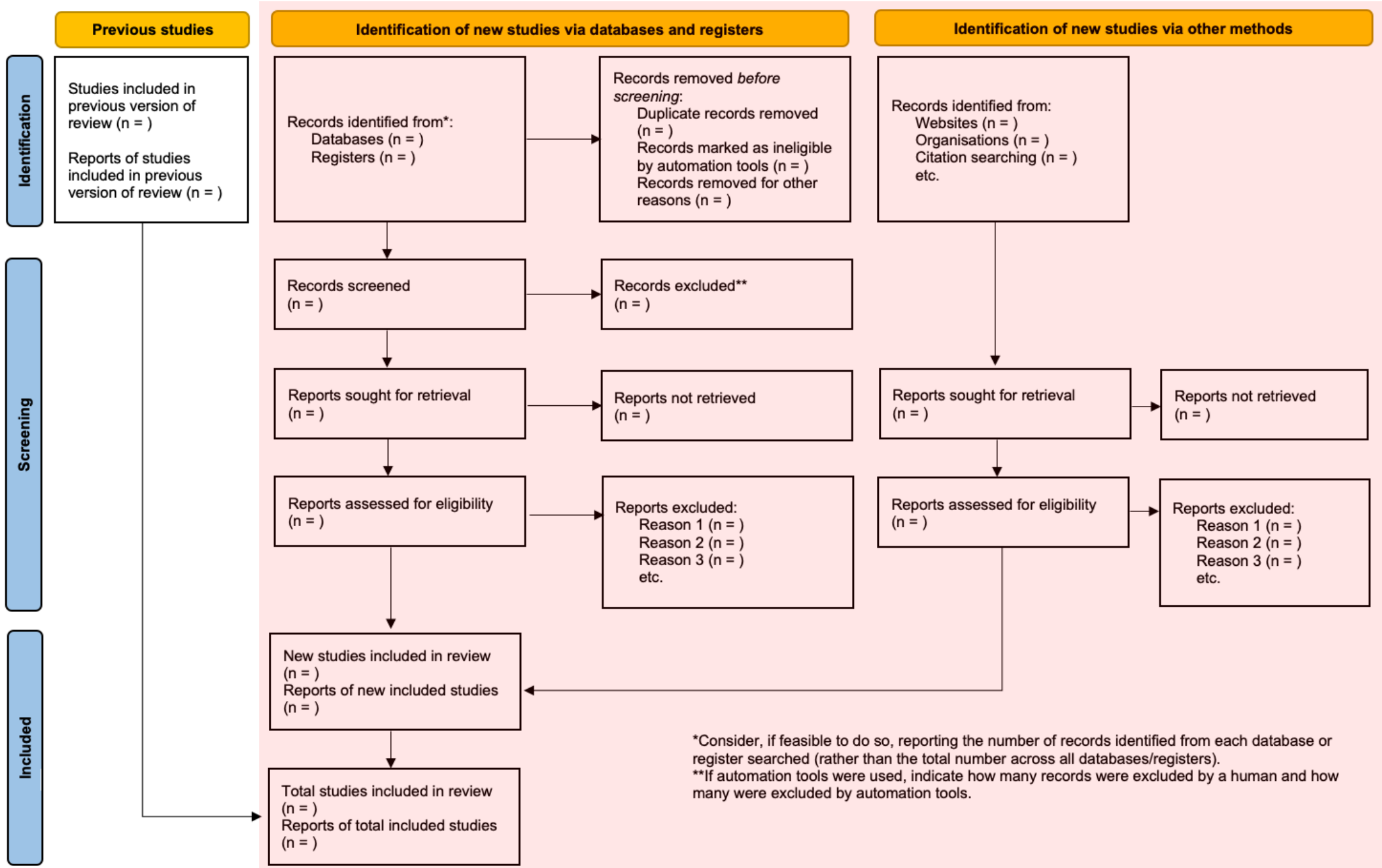
- specify number of records yielded per database
- exclusion before screening (duplicates, machine classifiers)
- reports that were not retrievable
- separation of databases/registers from other sources
- ongoing studies
- separate box to handle SR updates



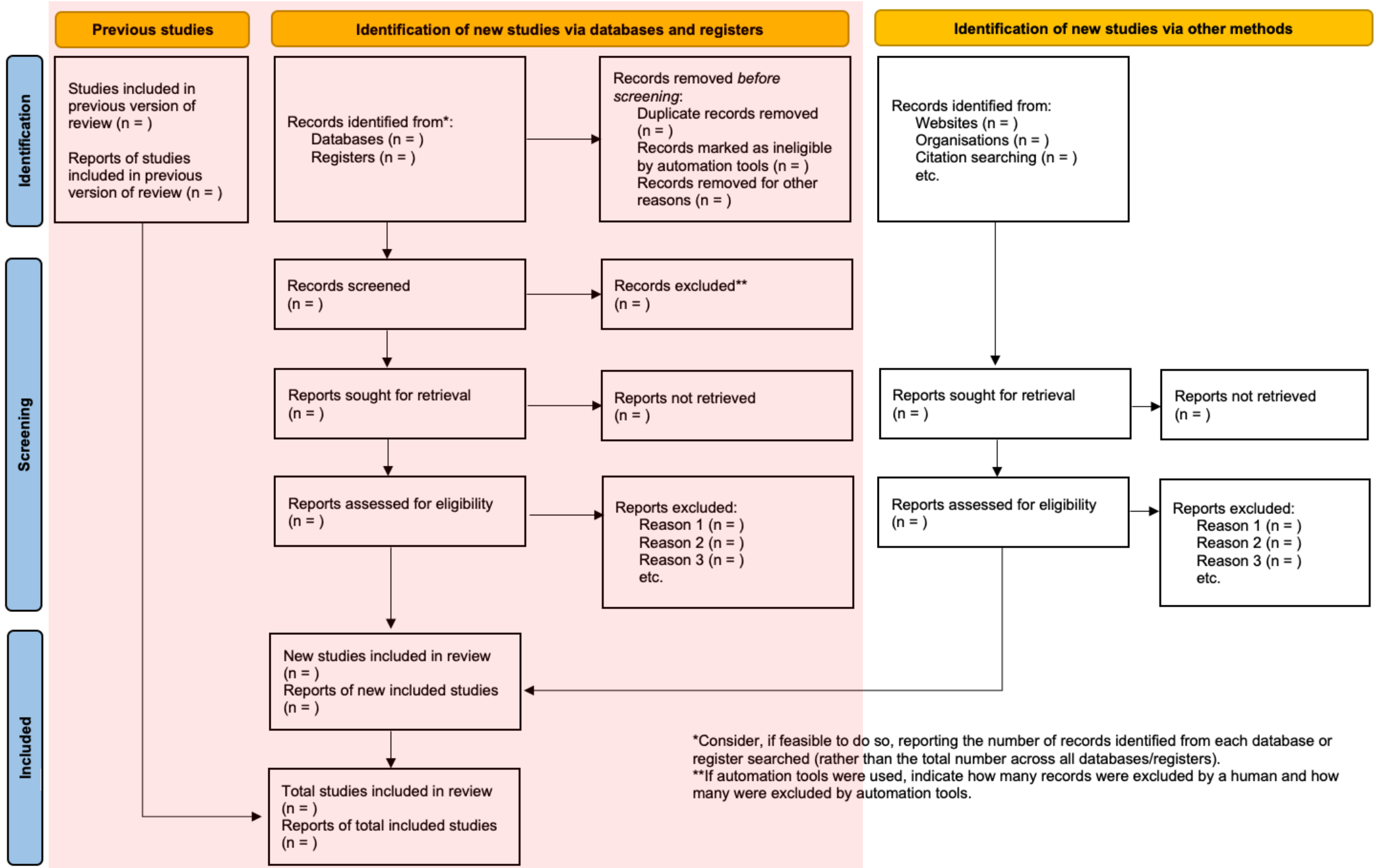
RISMA 2020 flow diagram for updated systematic reviews which included searches of databases, registers and other sources



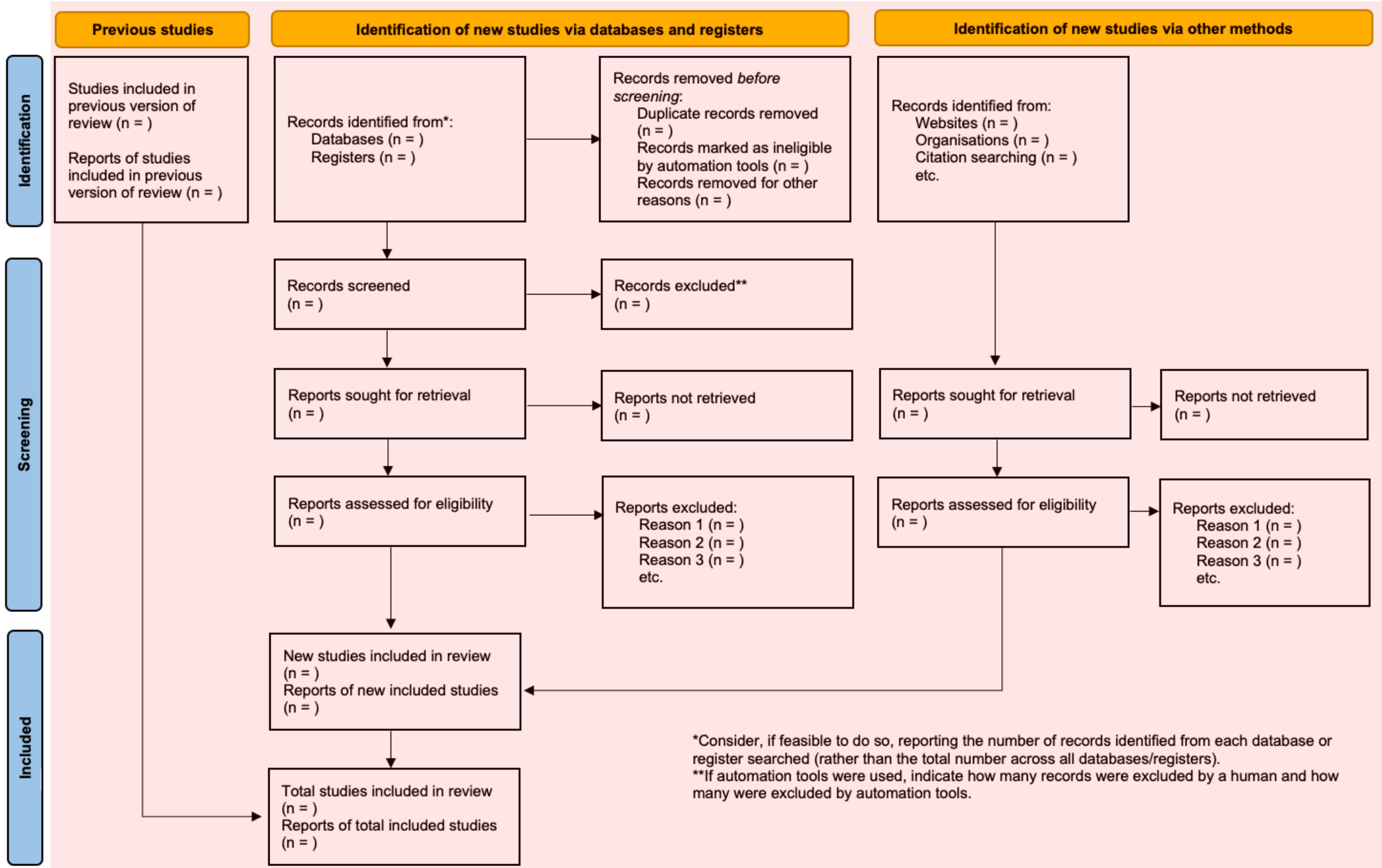
PRISMA 2020 flow diagram for updated systematic reviews which included searches of databases, registers and other sources



PRISMA 2020 flow diagram for updated systematic reviews which included searches of databases, registers and other sources



PRISMA 2020 flow diagram for updated systematic reviews which included searches of databases, registers and other sources



Andrew Booth
@AndrewB007h

And now PRISMA 2020 = Please Remember (I used to have 20:20 vision until) I Screened Many Articles

> **Andrew Booth** @Andrew... · Oct 11, 2018
> PRISMA = Please Realise I Screened Many Articles twitter.com/Ruth_Garside/s...

7:55 PM · Apr 30, 2021 · Twitter Web App

Concluding remarks

Implications and opportunities for IS

- Purpose of PRISMA 2020 is to ensure transparency and optimal reproducibility
  - not a tool to guide conduct or assess the quality of a search
- Sets out information required that should make the process of reporting the search easier
- Role of librarians/information specialists critical to both the conduct of high-quality SRs and to their reporting
- Important that contribution is appropriately recognised (authorship, acknowledgement)

> Material and methods
>
> Search strategy
>
> Six medical databases were searched including three English databases (Pubmed, Cochrane Library and Embase) and three Chinese databases (CNKI, Wan Fang Data, China Science and Technology Journal Database). The keywords are as follows: 'COVID-19', 'gastrointestinal symptoms' and so on.

Take home message

- PRISMA 2020 replaces the PRISMA 2009 statement, and includes new reporting guidance that reflects advances in methods to identify, select, appraise and synthesise studies

- See http://www.prisma-statement.org/ for latest versions of Word checklists and flow diagrams to download

- Contact me at matthew.page@monash.edu or @mjpages for more information