

Undertaking a Systematic Review: What You Need to Know

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Class Objectives

- Understand the importance of systematic reviews in research
- Distinguish between a narrative review & a systematic review
- Identify the steps involved in selecting members for a systematic review team
- Outline the steps in developing the systematic review protocol

Class Objectives

- Describe the steps for conducting the literature search
- Identify appropriate tools for managing data associated with a systematic review
- Understand the different types of bias associated with a systematic review
- Select the appropriate guidance document to write up your systematic review for publication

Systematic Reviews: Home

[Link to Online Guide](#)

NIH Library support for systematic reviews

Home

The Literature Search - Databases and Gray Literature

Scoring Guides




Documenting Your Work ▾

Systematic Review Protocols and Protocol Registries

Resources

Library Support

Systematic Reviews - Gold Standards

-  [PRISMA Statement for Reporting Systematic Reviews](#)
The PRISMA statement consists of a 27 item checklist of items deemed essential for transparent reporting of a systematic review.
-  [IOM Standards for Initiating a Systematic Review-brief](#)
List of standards for initiating a systematic reviews from the Institute of Medicine.
-  [IOM - Finding What Works Standards for Systematic Reviews](#)
Link to complete Institute of Medicine report on systematic review standards.

About this Guide

This online guide contains information sources, websites, and articles that can help you to conduct a systematic review. The guide was developed as an online companion to the "Undertaking a Systematic Review: What You Need to Know," class taught Nancy Terry and Doug Joubert.

If you need a one-on-one consultation on conducting a systematic review, please the NIH Library Information Desk at 301-496-1080.

Organizations


- [Agency for Healthcare Research and Quality](#)
AHRQ Methods Guide for Effectiveness and Comparative Effectiveness Reviews. The AHRQ Effective Health Care Program has a number of tools and resources to help consumers, clinicians, policymakers, and others make more informed health care decisions.
- [Centre for Reviews and Dissemination](#)
The Centre for Reviews and Dissemination provides research-based information about the effects of health and social care interventions and provides guidance on the undertaking of systematic reviews.
- [The Campbell Collaboration](#)

Informationist/Biomedical Librarian



Nancy Terry

[Email Me](#)

Chat is offline 

Contact:

National Institutes of Health Library
Division of Library Services
Office of Research Services

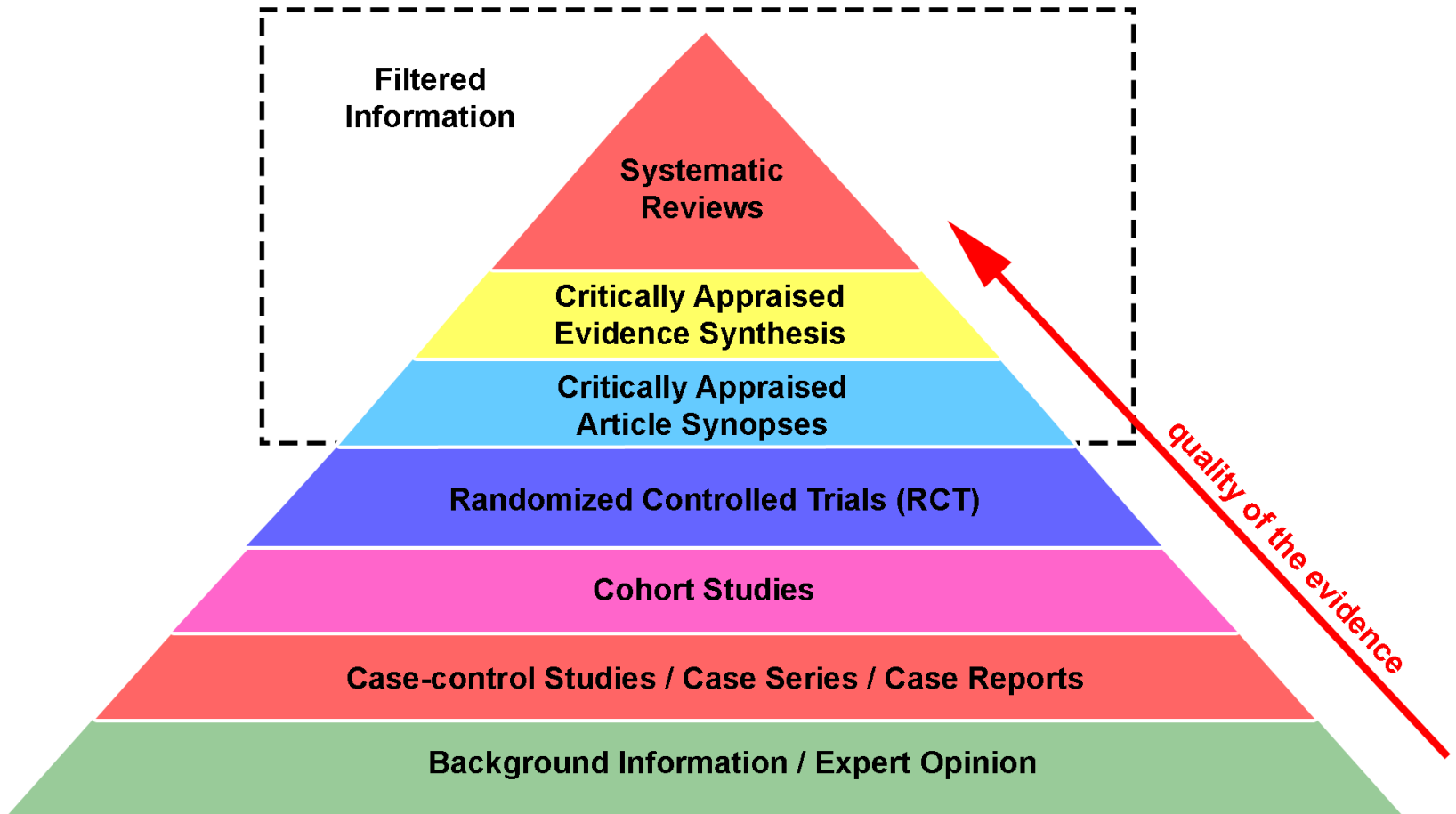
Overview of a Systematic Review

The slide features a series of horizontal bars. At the top is a dark red bar containing the title. Below it is a wide dark blue bar. A thin orange bar follows, and at the bottom is a wide grey bar.

What is a Systematic Review?

- “A systematic review attempts to collate all empirical evidence that fits pre-specified eligibility criteria to answer a specific research question. It uses explicit, systematic methods that are selected to minimize bias, thus providing reliable findings from which conclusions can be drawn and decisions made”.

Levels of Evidence



- Inform medical decision making
- Plan future research agendas
- Establish clinical or health policy
- Prevent unnecessary studies
- Possible use for comparative effectiveness research

Systematic Review Components

- Starts with a clearly articulated question
- Uses explicit, rigorous methods to identify, critically appraise, and synthesize relevant studies
- Appraises relevant published and unpublished evidence for validity before combining and analyzing data
- Reports methodology, studies included in the review, and conclusions
- Should be reproducible

Systematic vs Narrative Review

| Systematic Review | Narrative Review |
|--|--|
| Clear question to be answered or hypothesis to be tested | May also start with clear question but more often involves general discussion of subject with no stated hypothesis |
| Locates all relevant published and unpublished studies to limit impact of publication and other biases | Does not usually attempt to locate all relevant literature |
| Involves explicit description of what types of studies are to be included to limit selection bias | Usually does not describe why certain studies are included and others excluded |
| Examines in systematic manner the methods used in primary studies; investigates potential biases in those studies and sources of heterogeneity between study results | Often does not consider differences in study methods or study quality |
| Bases conclusions on those studies which are most methodologically sound | Often does not differentiate between methodologically sound and unsound studies |

- [Cochrane Collaboration](#)

- Produces and disseminates systematic reviews of health care interventions through the online Cochrane Library
- International source of high quality systematic reviews since 1993
- Cochrane Library vis NIH Library



- [Campbell Collaboration](#)

- An international research network that produces systematic reviews of the effects of social interventions



CRD: *Systematic Reviews:* [CRD](#)'s guidance for undertaking systematic reviews in health care

Cochrane Collaboration: Cochrane [Handbook](#) for Systematic Reviews of Interventions

Cochrane Collaboration: Methods [newsletter](#)

Institute of Medicine: [Finding What Works in Health Care: Standards for Systematic Reviews](#)

AHRQ: [Methods Guide for Effectiveness and Comparative Effectiveness Reviews](#)

- **PRISMA** (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)
- **PRISMA-E** (PRISMA + health equity reporting)
- **MOOSE** (Meta-analysis of Observational Studies in Epidemiology)
- **RAMESES** publication standards: meta-narrative reviews

- **EQUATOR**
 - Collects guidance documents on reporting SRs and other types of health research

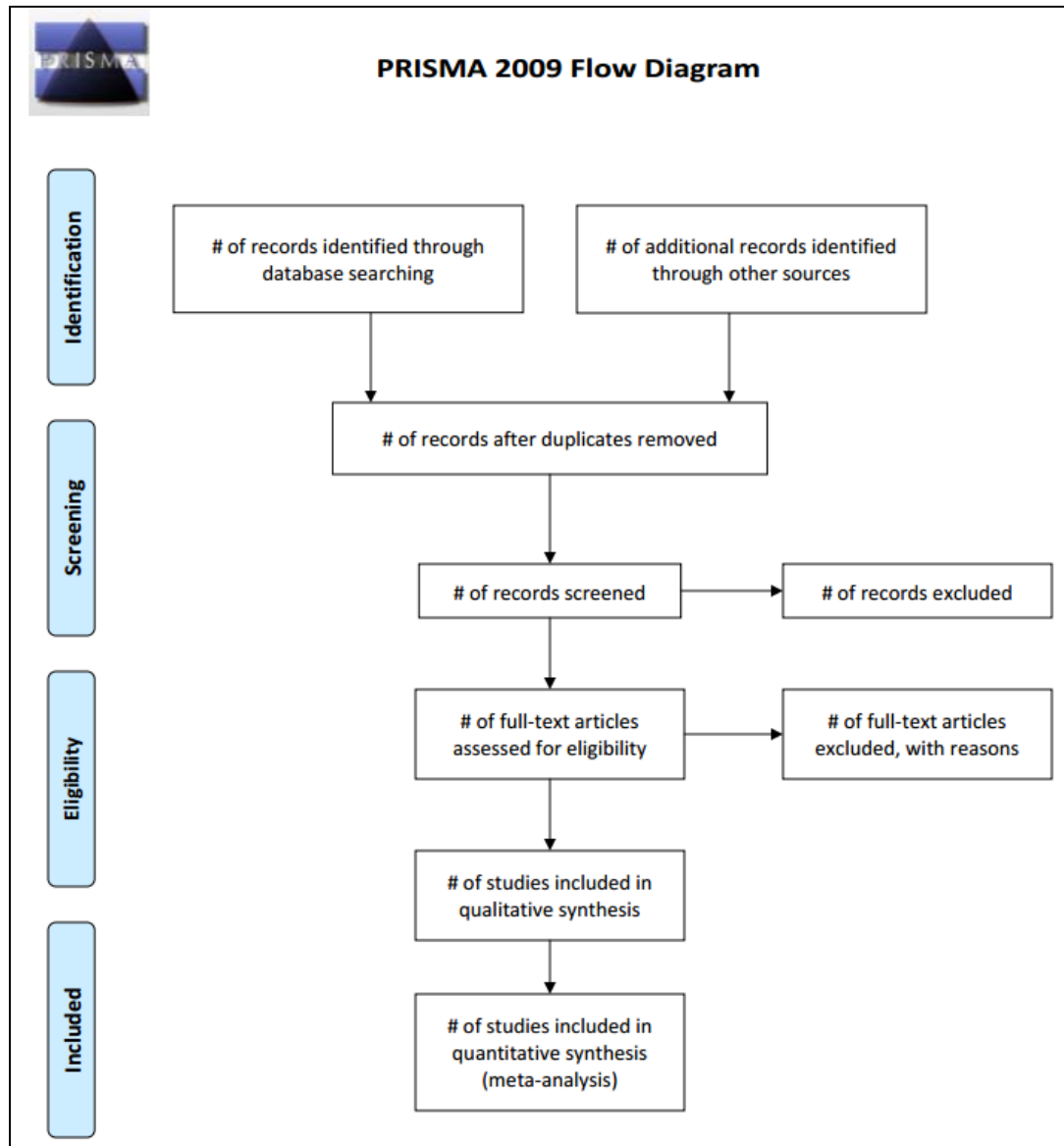
PRISMA Checklist (2009)



PRISMA 2009 Checklist

| Section/topic | # | Checklist item | Reported on page # |
|------------------------------------|----|---|--------------------|
| TITLE | | | |
| Title | 1 | Identify the report as a systematic review, meta-analysis, or both. | |
| ABSTRACT | | | |
| Structured summary | 2 | Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. | |
| INTRODUCTION | | | |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. | |
| Objectives | 4 | Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS). | |
| METHODS | | | |
| Protocol and registration | 5 | Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number. | |
| Eligibility criteria | 6 | Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. | |
| Information sources | 7 | Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched. | |
| Search | 8 | Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated. | |
| Study selection | 9 | State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis). | |
| Data collection process | 10 | Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators. | |
| Data items | 11 | List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made. | |
| Risk of bias in individual studies | 12 | Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. | |
| Summary measures | 13 | State the principal summary measures (e.g., risk ratio, difference in means). | |
| Synthesis of results | 14 | Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis. | |

PRISMA Flow Diagram (2009)



Steps in a Systematic Review

1, 2, 3, 4, 5, 6

7, 8, 9, 10, 11, 12

1. Assess need for a systematic review
2. Assemble the systematic review team
3. Develop a research question
4. Define inclusion and exclusion criteria
5. Develop the protocol for the systematic review
6. Locate studies
7. Title/abstract & full-text review

8. Extract data
9. Assess study quality
10. Analyze results
11. Write the systematic review
12. Submit the review
 - Update the review as needed

A Realistic SR Timeline

| Month | Activity |
|-------|--|
| 1-2 | Prepare protocol |
| 3-8 | Search for published & unpublished studies |
| 2-3 | Pilot test eligibility criteria |
| 3-8 | Inclusion assessments |
| 3 | Pilot test of 'Risk of Bias' assessment |
| 3-10 | Validity assessments |
| 3 | Pilot test data collection |
| 3-10 | Data collection |
| 3-10 | Data entry |
| 5-11 | Follow up on missing information |
| 8-10 | Analysis |
| 1-11 | Preparation of review report |
| 12- | Keep the review up-to-date |

- Include individuals with expertise in:
 - the pertinent clinical content areas
 - systematic review methods - methodologist
 - searching for relevant evidence - librarian/informationist
 - quantitative methods – biostatistician
- You want to make sure you have enough members to designate 2 reviewers & 1 tie breaker when reviewing records
- Also 1 administrative support person would be a good idea to include

- Developed before starting the review to serve as road map for the review
- Publication of the protocol prior to beginning:
 - Reduces impact of review authors' biases
 - Promotes transparency of methods and processes
 - Reduces potential for duplication
 - Allows for peer review of planned methods
- Registries
 - Proprietary: Cochrane, Campbell
 - Open: [PROSPERO](#) (Prospective Register of Ongoing Systematic Reviews)

The literature search

Form the Team

Search



- Confirm the need for the new review.
- Develop well-framed question(s) that will be answered through the review.
- A formula for a structured approach that helps you to identify terminology that captures the question you are trying to answer is called PICO.

- **P= Population/Patient/Problem/Program**
 - How would you describe a group of patients similar to yours?
- **I= Intervention, Prognostic Factor, Exposure**
 - Which main intervention, prognostic factor, or exposure are you considering?
- **C = Comparison**
 - What is the main alternative to compare with the intervention?
- **O = Outcomes**
 - What can you hope to accomplish, measure, improve or affect?

Question: Are sugar sweetened beverages associated with the development of dental caries in African-American and Hispanic children in the USA?

| PICO | |
|------------------------------|--|
| Population | African-American and Hispanic children |
| Intervention/Exposure | Sugar sweetened beverages |
| Comparison, if any | Control or Comparison Group |
| Outcome | Development of dental caries |

- A comprehensive literature search cannot be dependent on a single database.
- Inclusion of multiple databases helps avoid publication bias (geographic bias or bias against publication of negative results) in the systematic review.
- Cochrane recommends PubMed/MEDLINE, Embase, and the Cochrane Library Central Register of Controlled Trials (CENTRAL), at a minimum.

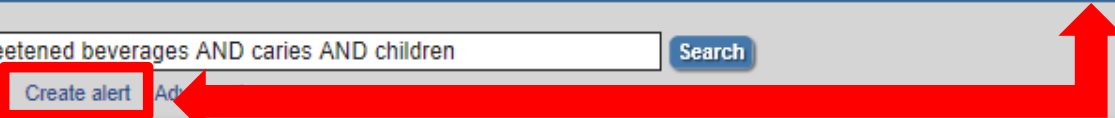
- Quality of the systematic review depends directly on the quality of the identified studies.
- Balance need for sensitivity (comprehensive) vs. specificity (precision) of retrieval.
- Strategies must take into account the unique structure and search functions of each database.

- Identify variant terminology/synonyms for specific concepts.
- Use both database controlled vocabulary + free text words
- Run preliminary searches to test recall and retrieval.
- It is very important to save your search strategies. In fact, when you are doing a SR, save the exact strategies you used for each database!

NCBI Resources How To nancyterry My NCBI Sign Out

PubMed.gov PubMed Search

US National Library of Medicine
National Institutes of Health

Create RSS Create alert Ad 

Help

Article types

Clinical Trial
Review
Customize ...

Text availability

Abstract
Free full text
Full text

PubMed

Commons
Reader comments
Trending articles

Publication dates

5 years
10 years
Custom range...

Species

Humans
Other Animals

[Clear all](#)

Summary 200 per page Sort by Most Recent

Send to:

Filters: [Manage Filters](#)

Search results

Items: 36

- [The association between sugar-sweetened beverages and dental caries among third-grade students in Georgia.](#)
Wilder JR, Kaste LM, Handler A, Chapple-McGruder T, Rankin KM.
J Public Health Dent. 2015 Sep 4. doi: 10.1111/jphd.12116. [Epub ahead of print]
PMID: 26339945
[Similar articles](#)
- [\[Use of sugars and sweeteners in children's diets. Recommendations of the Nutrition Committee of the Spanish Paediatric Association\].](#)
Gil-Campos M, San José González MA, Díaz Martín JJ; Comité de Nutrición de la Asociación Española de Pediatría.
An Pediatr (Barc). 2015 Mar 31. pii: S1695-4033(15)00073-9. doi: 10.1016/j.anpedi.2015.02.013. [Epub ahead of print]
Spanish.
PMID: 25840708 **Free Article**
[Similar articles](#)
- [Association of Sugar-Sweetened Beverage Intake during Infancy with Dental Caries in 6-year-olds.](#)
Park S, Lin M, Onufrak S, Li R.
Clin Nutr Res. 2015 Jan;4(1):9-17. doi: 10.7762/cnr.2015.4.1.9. Epub 2014 Dec 8.
PMID: 25713788 **Free PMC Article**
[Similar articles](#)

New feature

Try the new Display Settings option -
Sort by Relevance

Find related data

Database:

Search details

```
(( "carbohydrates" [MeSH  
Terms]  
OR "carbohydrates" [All  
Fields] OR "sugar" [All  
Fields]) AND sweetened [All
```

[See more...](#)

Recent Activity

PubMed

- Term for the mass of information that falls outside the mainstream of published journal and monograph literature, not controlled by commercial publishers
 - Often more current than published literature
 - Less publication bias and more global in scope
- Grey literature includes:
 - Unpublished or hard-to-find studies, reports, or dissertations
 - Conference abstracts or papers
 - Governmental research
 - Clinical trials (ongoing or unpublished)

- Sources for Grey Literature:
 - Library catalogs
 - Conference Proceedings
 - Clinical Trials databases, such as ClinicalTrials.gov
 - Dissertation Abstracts
 - Government databases, such as NTIS, WHO reports
 - Google Scholar
 - [HSR Information Central](#)
 - [National Institute for Health and Care Excellence](#) - UK
 - [Open Grey](#)
 - [New York Academy of Medicine Grey Literature Report](#)
 - Reference lists from selected studies

- **National and Regional Databases** – produced by countries and regions that concentrate on the literature produced by those regions
 - Examples: LILACS – Latin American and Caribbean Center on Health Sciences Information, Index Medicus for Eastern Mediterranean and for Southeast Asia, African Index Medicus and an Australasian Index Medicus.
- **Subject Specific Databases** – concentrate on the literature on a specific subject
 - Examples: International Pharmaceutical Abstracts, PsycINFO, Sociological Abstracts

- Hand Searching
 - Identify the most highly regarded journals in the field
 - Examine journal Table of Contents for potentially relevant articles
- Consultation with Experts
 - Ask clinical team members for experts in the field
 - Personal correspondence, etc.

Data organization

Search

→ Download

A diagram illustrating a data organization process. It features a dark red header bar at the top with the text 'Data organization'. Below this is a dark blue bar containing the word 'Search'. A white line starts from the end of 'Search', extends horizontally to the right, then turns vertically downwards, and finally turns horizontally to the right again, ending with an arrowhead pointing to the word 'Download' in a dark grey bar. A thin orange horizontal line is positioned between the dark blue bar and the dark grey bar.

- Using software, such as DistillerSR, EndNote, Mendeley, or Zotero you can:
 - Create and maintain a searchable database of records related to the SR
 - Create groups & group sets
 - Use labels to annotate records with database details
 - Share records (EndNote/EN Online, Mendeley, or Zotero)
 - Organize PDFs
 - Create citations and bibliography when writing up the results of the SR

DistillerSR (example)

The screenshot shows the DistillerSR web interface. At the top, the logo "DistillerSR" is on the left, and a search bar contains the text "NIMHD OBESITY STIGMA". To the right of the search bar is a "Find Reference" button and a hamburger menu icon. Below the search bar is a navigation bar with icons for a group of people (1), an envelope (0), a gear, a question mark, a speech bubble, and a right arrow. Underneath the navigation bar are menu items: "Review »", "Datarama", "Reports »", "References »", "Forms »", "Manage Levels »", and "Users »". Below these is "Project »".

Below the menu items is a section for "Create new reference". It includes a search input field, a "Level" dropdown menu set to "Any Level", a "Biblioformat" dropdown menu set to "AMA Abstract", a "Per Page" dropdown menu set to "10", and a "Search" button.

Below the search filters is a pagination bar with the numbers "1 2 3 4 5 Next Last" and "(918 total)".

The main content area displays a list of references. The first reference is by D. K. Voelker, J. J. Reel, and C. Greenleaf, titled "Weight status and body image perceptions in adolescents: current perspectives." The second reference is by K. R. Case, A. Perez, D. L. Saxton, D. M. Hoelscher, and A. E. Springer, titled "Bullied Status and Physical Activity in Texas Adolescents."

EndNote Library (example)

The screenshot displays the EndNote application window. The top menu bar includes File, Edit, References, Groups, Tools, Window, and Help. Below the menu is a toolbar with various icons for file operations and a search bar labeled 'Quick Search'. The left sidebar shows the 'My Library' structure, including 'All References (1727)', 'Unfiled (0)', 'Trash (0)', and several 'My Groups' folders like 'ogmh_duplicates (354)', 'ogmh_medline (448)', 'ogmh_psychnet (102)', and 'ogmh_scopus (823)'. The main pane shows a list of references with columns for Label, Author, Year, and Title. The first reference is selected and highlighted in blue.

| Label | Author | Year | Title |
|---------|---|------|--|
| medline | Whitley, R.; Lawson, W. B. | 2010 | The psychiatric rehabilitation of Af |
| medline | Wilder, J. F.; Plutchnik, R.; Conte, H. R. | 1977 | Compliance with psychiatric emerg |
| medline | Williams, J.; Klinepeter, K.; Palmes, G.; Pulley, A.; Me... | 2007 | Behavioral health practices in the n |
| medline | Woodward, A. T.; Taylor, R. J.; Bullard, K. M.; Neighb... | 2008 | Use of professional and informal su |
| medline | Wu, C. H.; Erickson, S. R.; Piette, J. D.; Balkrishnan, R. | 2012 | The association of race, comorbid a |
| medline | Wu, L. T.; Blazer, D. G. | 2012 | Datapoints: Use of medications and |
| medline | Wu, L. T.; Blazer, D. G.; Li, T. K.; Woody, G. E. | 2011 | Treatment use and barriers among |
| medline | Wu, P.; Katic, B. J.; Liu, X.; Fan, B.; Fuller, C. J. | 2010 | Mental health service use among si |
| medline | Yamamoto, J. | 1978 | Therapy for Asian Americans |
| medline | Yamamoto, J.; Steinberg, A. | 1981 | Ethnic, racial, and social class facto |
| medline | Yang, H. W.; Simoni-Wastila, L.; Zuckerman, I. H.; Stu... | 2008 | Benzodiazepine use and expenditur |
| medline | Yang, L. H.; Chen, F. P.; Sia, K. J.; Lam, J.; Lam, K.; Ng... | 2014 | "What matters most:" A cultural m |

Below the list, the 'Reference' tab is active, showing a preview of the selected article. The preview includes the citation and the beginning of the abstract.

Reference Preview Attached PDFs

Whitley, R. and W. B. Lawson (2010). "The psychiatric rehabilitation of African Americans with severe mental illness." *Psychiatr Serv* **61**(5): 508-511.

African Americans make up approximately 12% of the U.S. population, a total of around 36 million people. Evidence suggests that African Americans suffer from significant and persistent disparities within the mental health system. African Americans with severe mental illness are less likely than Euro-Americans to access mental health services, more likely to drop out of treatment, more likely to receive poor-quality care, and more likely to be dissatisfied with care. Dominant patterns of treatment for African Americans with psychiatric disabilities are often least suited to long-term rehabilitation. To be successful, interventions must simultaneously target three levels: macro, provider, and patient. Five domains are posited that cut across these levels. These are cross-cultural communication, discrimination, explanatory models, stigma, and family involvement. These need appropriate research and action to enhance the psychiatric rehabilitation of African Americans. Potential solutions to overcome barriers raised within these domains

Showing 1727 of 1727 references. Layout

Mendeley (example)

The screenshot displays the Mendeley Desktop application window. The interface includes a menu bar (File, Edit, View, Tools, Help), a toolbar with icons for adding files, folders, related items, sharing, and syncing, and a search bar. On the left, a sidebar shows a folder tree with 'ordghm_sysreview' selected. The main pane shows a list of documents with columns for Authors, Title, Year, Published, and Access. The right pane provides details for the selected document, including its type (Journal Article), title, authors, journal information, and an abstract.

Mendeley Desktop

File Edit View Tools Help

Add Files Folders Related Share Sync

Search...

ordghm_sysreview Edit Settings

| ★ | ● | 📄 | Authors | Title | Year | Published | Ac |
|---|---|---|------------------|---|------|--------------------------|-----|
| ☆ | ● | | Aalsma, M C... | Use of outpatient care by juvenile detainees upon com... | 2012 | Psychiatric Services | Sej |
| ☆ | ● | | Abdul Kadir, ... | Malaysian Moslem mothers' experience of depression an... | 2010 | Cult Med Psychiatry | Oc |
| ☆ | ● | | Abe-Kim, J; ... | Use of mental health-related services among immigrant an... | 2007 | American Journal o... | Sej |
| ☆ | ● | | Abram, K M; ... | Comorbid Psychiatric Disorders in Youth in Juvenile Detention | 2003 | Archives of General P... | Sej |
| ☆ | ● | | Abrams, L S... | Barriers to service use for postpartum depression symp... | 2009 | Qual Health Res | Oc |
| ☆ | ● | | Achenbach, ... | Are American children's problems getting worse? A 1... | 1993 | Journal of the Ameri... | Sej |
| ☆ | ● | | Acosta, F X ... | Barriers between mental health services and Mexican ... | 1979 | American Journal o... | Sej |
| ☆ | ● | | Aczon-Arms... | Depression and chronic illness: Asian/Pacific Islander adults ... | 2013 | Issues Ment Heal... | Oc |
| ☆ | ● | | Adams, S H; ... | Medical home for adolescents: Low attainment rates for tho... | 2013 | Academic Pediatrics | Sej |
| ☆ | ● | | Adebimpe, ... | A second opinion on the use of white norms in psychiatric dia... | 2004 | Psychiatric Annals | Sej |
| ☆ | ● | | Adegbite-A... | An update on antidepressant use and suicidality in pediatri... | 2012 | Expert Opinion o... | Sej |

Details Notes Contents Enrichments

Type: Journal Article

Use of outpatient care by juvenile detainees upon community reentry: Effects of mental health screening and referral

Authors: M. Aalsma, Y. Tong, K. Lane et al.

View research catalog entry for this paper

Journal: *Psychiatric Services*

Year: 2012

Volume: 63

Issue:

Pages: 997-1003

Abstract:

Objective: This study assessed rates of mental health care utilization among juvenile detainees

1 of 1375 documents selected

- Document the following:
 - Lists of databases and vendor (e.g., MEDLINE/PubMed, MEDLINE/Ovid)
 - Limits of the search (date ranges, type of study, language restrictions)
 - Number of references retrieved
 - Exact search strategies for each database
 - Sources searched for gray literature
 - Other search techniques (e.g., scanning bibliographies of pertinent articles, contacting authors, hand-searching, etc.)

Refer to PRISMA, the gold standard for conducting and reporting SR searches.

Record Keeping (example)

- Set 1: Racial or Ethnic Disparities terms.
- Set 2: Access Terms.
- Set 3: Mental Health Services.
- Set 4: Disorders: depressive disorders, anxiety disorders, schizophrenia, or bipolar disorder terms.
- APA PsycNET, Medline, and Scopus databases were searched:
 - APA PsycNET (n=102, number of records)
 - Medline (n=448, number of records)
 - Scopus (n=823, number of records)

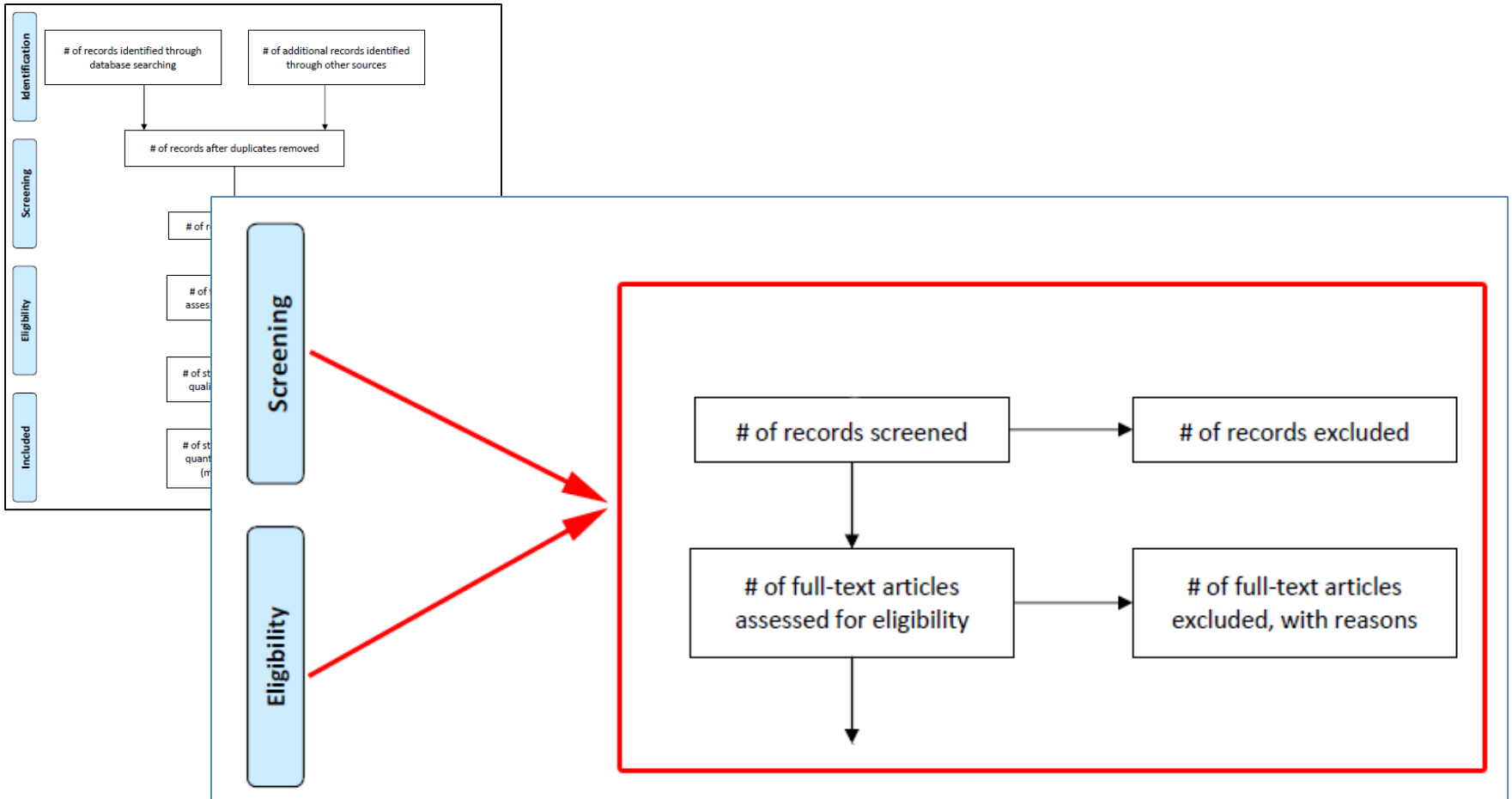
Selecting studies for inclusion

Download

→ Screen



Adhering to PRISMA statement



- Once the databases searches are complete, the next stage in the systematic review is to identify and select relevant articles from those retrieved.
- Each article should be evaluated using the inclusion and exclusion criteria, define in the SR protocol.
- At least 2 reviewers should review each article independently, to minimize bias.
- Where uncertainty exists, a third review should make an independent decision.

- Study eligibility screening
 - Title/abstract level (determining in or out)
 - Full-text level (determining in or out)
- Each level of screening is guided by the inclusion/exclusions criteria defined in your SR protocol.



Caffeine for daytime drowsiness Eligibility checklist

Study ID: _____

Screened by: _____

1. Study design

Is the study a randomised controlled trial?

Yes No (exclude) Can't tell

2. Participants

Did the study include adults undergoing normal daily activities?

Yes No (exclude) Can't tell

Did the study include adults reporting symptoms of daytime drowsiness (e.g. reduced alertness, fatigue or lowered mood)?

Yes No (exclude) Can't tell

Screening Process (example)

- First stage of screening involved screening the title/abstract against the inclusion and exclusion criteria.
- Epi Info™ 7 was used to develop a screening form.
- 4 screeners, worked in pairs.
- Applied inclusion and exclusion factors using screening form.
- Intercoder reliability (concordance rate) was discussed during weekly meetings.

The screenshot shows the Epi Info 7 interface for a 'Title/Abstract Screening Form'. The window title is 'ei Enter - [DisparitiesSystematicReview\InitialScreening]'. The menu bar includes File, Edit, View, Tools, and Help. The toolbar contains icons for Open Form, Save, Print, Find, New Record, and navigation controls (1 of 424), along with Delete, Undo, Line Listing, Dashboard, and Map. The left sidebar shows a 'Pages' tree with 'InitialScreening' and 'Page 1'. Below it is a 'Linked Records' section with 'Exposed From' and 'Exposed To' tabs, and buttons for 'Unlink', 'Add Exposure...', and 'View SNA Graph...'. The main area is titled 'Title/Abstract Screening Form' and contains the following fields and options:

- Researcher name:** A text input field with a dropdown menu containing:
 - No Name List
 - Open Access
 - Drug-related
 - Children & La Femme
 - Public Health
- Article number:** A text input field containing the value '1'.
- Should we include this study for data extraction? (Err on the side of inclusion rather than exclusion, since we can take a closer look during full-text screening)**
 - Yes
 - Unclear
 - No
- ***When marking 'unclear', also mark one of the following three check boxes so that we know what you are unsure about.**

The status bar at the bottom shows 'Ready' and system information: en-US, 7.1.3.10, CAPS, NUM, INS.

The screenshot displays the Epi Info 7 software interface. The title bar reads "Enter - [DisparitiesSystematicReview\InitialScreening]". The menu bar includes "File", "Edit", "View", "Tools", and "Help". The toolbar contains icons for "Open Form", "Save", "Print", "Find", "New Record", "Delete", "Undo", "Line Listing", "Dashboard", and "Map". The main window shows "Page 1" of a form titled "InitialScreening". The form content is as follows:

If NO, which inclusion criteria were NOT met?

- Study design
(Exclude non-intervention, theory-based, survey-based, policy, or conceptual paper without data)
- Check if this is a survey-based study that meets all other inclusion criteria and concerns access to mental health care.
- Participants
(Exclude if this study does not concern racial/ethnic minorities in the U.S.)
- Condition of Interest
 - *Include interventions that reduce racial/ethnic disparities in mental health care.
 - * Include use of religious services (e.g. clergy, pastor, spiritual healer), complementary or alternative medicine doctors, or social services
 - * Exclude long term care or palliative care use for the elderly, or service use for domestic violence

On the left side, there is a "Pages" pane showing "InitialScreening" and "Page 1". Below it is a "Linked Records" pane with "Exposed From" and "Exposed To" fields, an "Unlink" button, an "Add Exposure..." button, and a "View SNA Graph..." button. The status bar at the bottom shows "Ready" and system information: "en-US 7.1.3.10 CAPS NUM INS".

Screening Alternatives

The image displays a workflow for screening research articles. It starts with a browser window showing a study abstract about endovascular repair for MTAAs. This is followed by a software interface for reviewing articles, which includes a list of studies awaiting classification. A survey analysis tool is then used to analyze responses, showing a donut chart and a table of results.

Study Abstract (cerapp.systematic-review.ca):

of this study is to review the use of endovascular repair for MTAAs.

Exclusion Criteria:

3. MEDDEV Exclusion Criteria. Select all that apply.

Article not related to the device of interest

Review Manager 5.3:

[Intervention] for Racial and ethnic disparities

Text of Review

Studies awaiting classification

- Afuwape 2010
- Afuwape Sarah A, Craig Tom K J, Har...
- Alegria 2002
- Alexandre 2009
- Angold 2002
- Areán 2008
- Ayalon 2007
- Ayalon 2007a
- Baker 1984
- Baker-Ericzén 2012
- Beiser 1982
- Berry 2009
- Bhugra 2002
- Boyd 2009
- Breland-Noble 2011
- Budin 2004
- Cabassa 2007
- Caporino 2014
- Cardemil 2010

Analyze (Survey Results):

SHOWING: 1477 of 1477 Responses

PAGE: 2 of 2

Weighted Average

Skipped: 1 Answered: 1476

| | Weighted Average | Total Responses | Yes | No (exclude) | Can't tell |
|--|------------------|-----------------|----------|--------------|------------|
| Written in English about native English-speaking dyads that only speak | 1.2 | 651 | 78% 508 | 19% 126 | 3% 17 |
| Concerns only human dyads? | 1.0 | 524 | 100% 522 | 0% 1 | 0% 1 |
| Concerns children birth through 5 years? | 1.3 | 544 | 85% 460 | 5% 25 | 11% 59 |
| Parent population is not selected due to parental physical/mental health | 1.1 | 537 | 95% 512 | 4% 21 | 1% 4 |

Good work! You screened **5** references in **22** seconds, our guess is you can do **28** in two minutes.

| Reference | Should we include this records in the second level of review |
|---|--|
| R. M. Puhl, J. D. Latner, K. O'Brien, J. Luedicke, M. Forhan, S. Danielsdottir (2015). Cross-national perspectives about weight-based bullying in youth: nature, extent and remedies <i>Pediatr Obes</i> , #volume# (#issue#), #Pages# | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| T. Farhat (2015). Stigma, Obesity and Adolescent Risk Behaviors: Current Research and Future Directions <i>Curr Opin Psychol</i> , 5(#issue#), 56-68 | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| A. B. Goldschmidt, M. M. Wall, K. A. Loth, D. Neumark-Sztainer (2015). Risk Factors for Disordered Eating in Overweight Adolescents and Young Adults <i>J Pediatr Psychol</i> , #volume#(#issue#), #Pages# | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| N. Hawkes (2015). Bullying in childhood may be linked to heart disease risk, study says <i>Bmj</i> , 350(#issue#), h2738 | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| R. Takizawa, A. Danese, B. Maughan, L. Arseneault (2015). Bullying victimization in childhood predicts inflammation and obesity at mid-life: a five-decade birth cohort study <i>Psychol Med</i> , 45(#issue#), 2705-15 | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| J. M. Berge, A. Trofholz, S. Fong, L. Blue, D. Neumark-Sztainer (2015). A qualitative analysis of parents' perceptions of weight talk and weight teasing in the home environments of diverse low-income children <i>Body Image</i> , 15(#issue#), 8-15 | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Y. Rodriguez-Carmona, M. Perez-Rodriguez, E. Gamez-Valdez, F. J. Lopez-Alavez, C. I. Hernandez-Armenta, N. Vega-Monter, G. Leyva-Garcia, T. | <input type="checkbox"/> Yes <input type="checkbox"/> No |

- It is often recommended to formally assess inter-rater agreement across studies for each item on the selection form.
- The simplest measure is to compute the percentage of agreement between each reviewer.
- A kappa score (k-statistic) is often used to measure agreement, that is not due to chance.
- This can be used to create a concordance report
- Background article: Landis, J. R., et al. (1977). The Measurement of Observer Agreement for Categorical Data. *Biometrics*, 33(1), 159-174

4.15.14

Initial screening interim concordance report

Article numbers 801-901

Concordance between Doug and [REDACTED]:

58/100 = 58% concordance

Discordant pairs:

[REDACTED] "No"; Doug "Unclear" (2, 1)

802 – Not an intervention; studies focused on recruitment into studies, not improving access to mental health services

810 – Not an intervention; seems like a concept paper.

813 – This is tricky. It is evaluating the reach of the Comprehensive Community Mental Health Services for Children and Their Families Program and not exactly an intervention in a traditional sense with an intervention and a control group. Maybe it is worth examining the full-text.

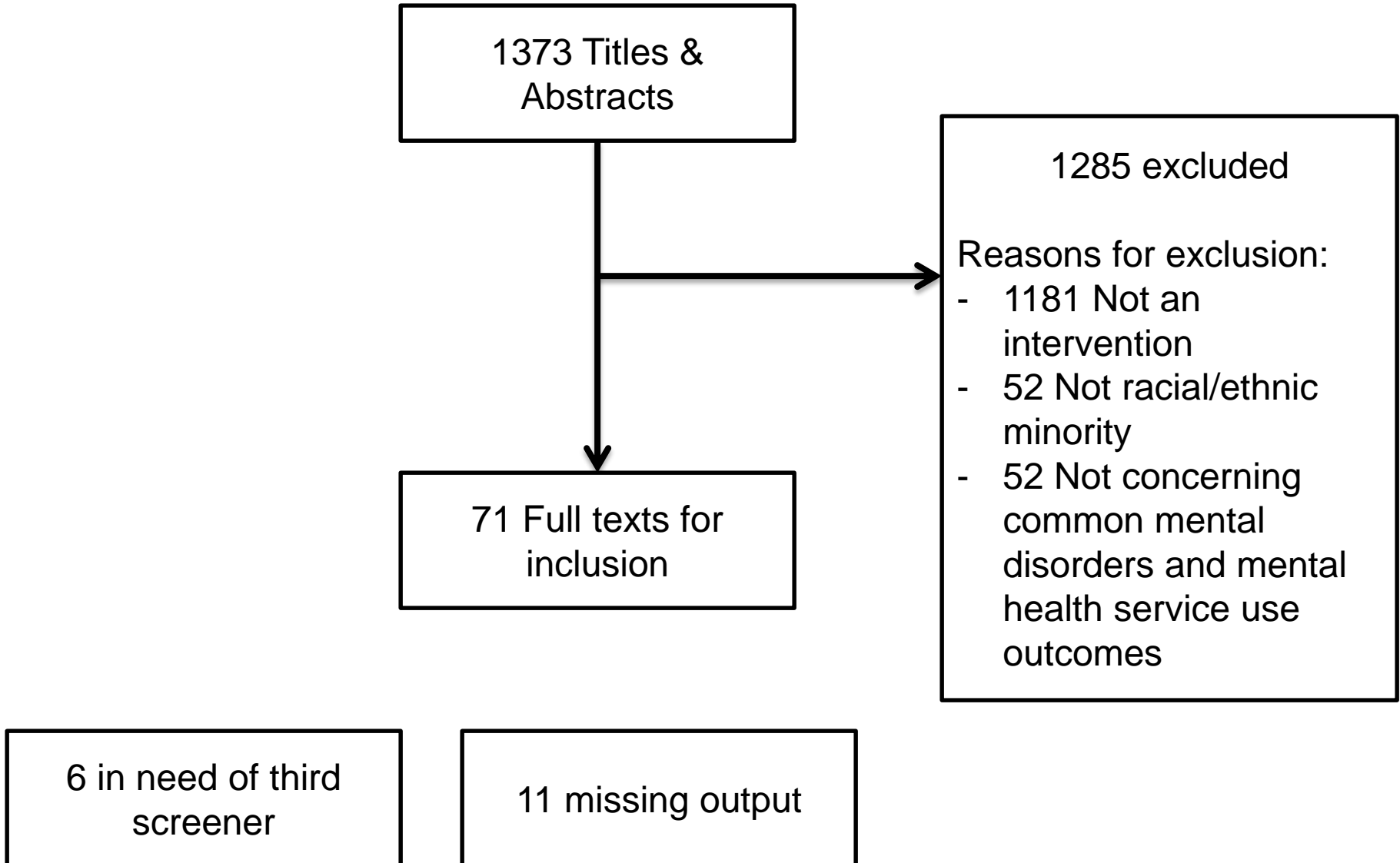
819 – This is a cross-sectional study (survey) and not an intervention

822 – This short abstract does not seem to suggest an intervention

824 – Not an intervention; focus is on recruitment into research

828 – Exclude due to study design; The prevalence of antidepressant treatment within a 12-month

Screening counts (example)



After screening...

- Once screening of all relevant full-text reports is complete, you will have:
 - A set of studies eligible for coding (data extraction).
 - An accounting of the ineligible studies and the reasons for their ineligibility.
 - Campbell and Cochrane reviews often include a table of ineligible studies as an appendix.
 - You are now prepared to move to the Data Extraction (coding) phase

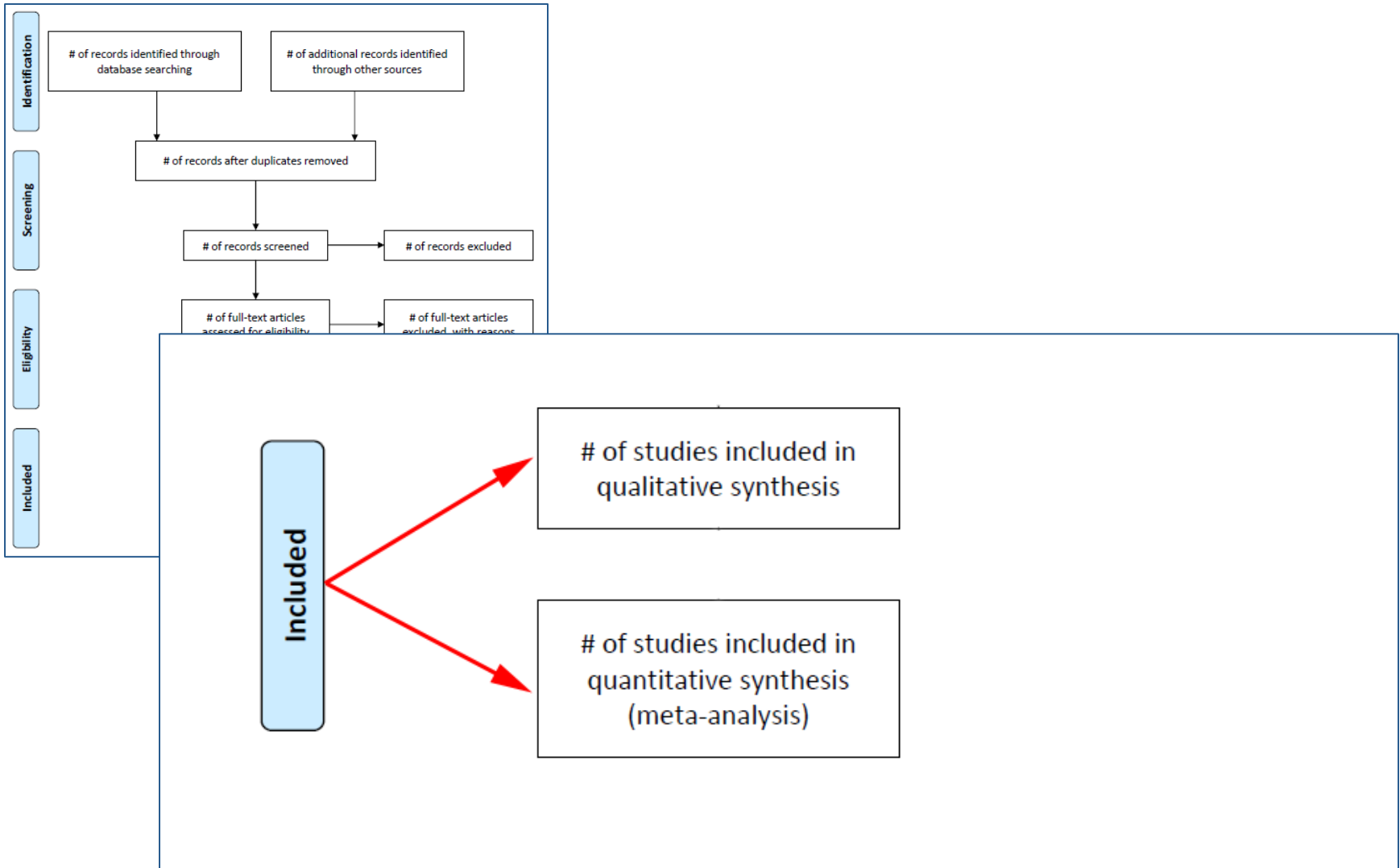
Data Extraction

Screen

Coding



Adhering to PRISMA statement



What data should you collect?

- Comprehensive data about each study:
 - Participants/clients/sample
 - Interventions
 - Methods and potential sources of bias
 - Outcomes effect sizes, and authors conclusions
 - Sources of funding
- This data is required for:
 - References
 - Description of included studies
 - Risk of bias assessment
 - Analysis

- The coding manual explicitly outlines what you will be looking at, when extracting data from studies.
- Cochrane recommends that you **pilot your data extraction form**, to ensure that all participating authors are retrieving comparable results, and this should be noted in the protocol.
- Information on study characteristics should provide enough information to allow readers to assess the applicability of the findings to their area of interest.

Studies with no usable data

- Studies must be included in the review if they meet your pre-defined criteria.
 - Studies that do not **report** outcomes of interested might have still **measured** them, so these still need to be included in your review.
 - Studies that “did not **measure** outcomes of interest may only be excluded if **measured outcomes** were included in your **predefined eligibility criteria.**”
- Also, you must report excluded studies, and why these studies were excluded.

- Multiple studies on the same data (study versus a report).
 - Especially in large studies...people will publish multiple articles and you cannot treat these as separate studies-same sample, same experiment.
 - Campbell recommends that you identify all "friend studies" and code them as a "block"
- Publication type and publication bias issues
 - This is why searching grey literature is so important
- Publication date versus study date (sometimes hard to find or determine)

What is bias, and what is not bias?

- There are two elements that affect the validity of the findings from a systematic review:
 - External validity: how applicable are the **sample** results to the **population**.
 - Internal validity: how correct is your estimate of the effect you are trying to measure.
- Bias is the systematic error or a deviation from the “truth.”
 - Bias is directly related to the internal validity of a study.
- Bias is **not** the same as **imprecision**...this is **random error**.

- Variety of options for coding study methods:
 - Cochrane Risk of Bias framework
 - GRADE system
 - Method quality checklist
 - Direct coding of methodological characteristics

Common types of bias

| Type of bias | Description | Collaboration's 'Risk of bias' tool domain |
|-------------------------|---|--|
| Selection bias | Systematic differences between baseline characteristics of the groups that are compared. | <ul style="list-style-type: none"> • Sequence generation: due to inadequate generation of a randomized sequence. • Allocation concealment: due to inadequate concealment of allocations prior to assignment. |
| Performance bias | Something other than the intervention affects groups differently. | <ul style="list-style-type: none"> • Blinding of participants, personnel and outcome assessors. • Other potential threats to validity. |
| Detection bias | Method of outcomes assessment affects group comparison. | <ul style="list-style-type: none"> • Blinding of participants, personnel and outcome assessors. • Other potential threats to validity. |
| Attrition bias | Systematic differences in the loss of participants from the study and how they were accounted for in the results. | <ul style="list-style-type: none"> • Incomplete outcome data. • Blinding of participants, personnel and outcome assessors. |
| Reporting bias | Systematic differences between reported and unreported findings. Only report outcomes of interest. | <ul style="list-style-type: none"> • Selective outcome reporting. |

The GRADE System

| GRADE | DEFINITION |
|------------------|---|
| High ⊕⊕⊕⊕ | Further research is very unlikely to change our confidence in the estimate of effect. |
| Moderate ⊕⊕⊕○ | Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. |
| Low ⊕⊕○○ | Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. |
| Very Low ⊕○○○ | Any estimate of effect is very uncertain. |

Method quality checklist

- More than 200 scales and checklists available, few if any appropriate for systematic reviews
- Overall study quality scores have questionable reliability and validity (Joni et al., 2001):
 - Conflate different methodological issues and study design/implementation features, which may have different impacts on reliability/validity
 - Preferable to examine potential influence of key components of methodological quality individually
- Weighting results by study quality scores is not advised!

Methodological Quality Assessment of Studies for RCTs

- Jadad score (for RCTs)
- McMaster University Harms scale (McHarm) tool
- Physiotherapy Evidence Database (PEDro) scale

Methodological Quality Assessment of Studies for non-RCTs

- AHRQ Medical Test Guidance.
- Cochrane Effective Practice and Organisation of Care (EPOC) Group Risk of Bias Tool.
- Quality Assessment of Diagnostic Accuracy Studies (QUADAS).
- McMaster University Harms scale (McHarm) tool.
- Newcastle - Ottawa Quality Assessment Scale (case control/cohort) studies.

Assessment of study quality and risk of bias (public health studies)

- Assessing the quality of public health and health promotion studies, and their resulting risk of bias, may be difficult, partly due to the wide variety of study designs used (Cochrane, 2011).
 - EPHPP Assessment Tool
 - Critical Appraisal Skills Programme (CASP) Appraisal Checklist
 - National Centre for Social Research (UK)
 - Cochrane Public Health Group (CPHG)

- Too many coding items
 - Coding items should be outlined in your SR protocol: be selective in the number of items you want to code (inclusion/exclusion criteria)
- Coding two reports from the same study as two different studies
- Coder drift
 - You have started coding one way...and then 50 studies later you have drifted away from original coding method
- Failure to ask questions (checking in)
 - If you are not comparing notes and asking questions during coding...then you are doing something wrong

Synthesizing the Evidence

Coding



Writing

- **ICJME authorship recommendations**

 - **Defining the Role of Authors and Contributors**

 - Why authorship matters
 - Who is an author
 - Contributions of non-authors

- **Journal editorial and authorship instructions/policies**

 - Acceptance of sys reviews
 - How to report a systematic review
 - Which standard(s) to use etc.
 - Governs acknowledgements too

- The Institute of Medicine recommendations are organized into the following categories:
 - Systematic Reviews Published in Journals
 - Recommended Standard for Preparing the Final Report
 - Recommended Standard for Report Review
 - Recommended Standard for Publishing the Final Report
- **PRISMA Statement & Checklist***
- **Cochrane Handbook*** for Systematic Reviews of Interventions
- Others mentioned earlier

| Section/topic | # | Checklist item | Reported on page # |
|--------------------|---|---|--------------------|
| TITLE | | | |
| Title | 1 | Identify the report as a systematic review, meta-analysis, or both. | |
| ABSTRACT | | | |
| Structured summary | 2 | Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. | |

- **PRISMA checklist** outlines what information should be included in the various sections of your paper
- PRISMA for abstracts – use structured summary

[Cochrane Handbook](#) standard on Abstract information

- List databases searched
- Language or publication status restrictions
- Dates of last search for each dbase or period searched

[Laryngoscope](#). 2012 Jul;122(7):1455-62. doi: 10.1002/lary.23365. Epub 2012 May 2.

Olfactory identification testing as a predictor of the development of Alzheimer's dementia: a systematic review.

Sun GH¹, Raji CA, Maceachern MP, Burke JF.

⊕ Author information

Abstract

OBJECTIVES/HYPOTHESIS: To evaluate the utility of olfactory identification tests as prognostic instruments for Alzheimer's dementia (AD).

STUDY DESIGN: Systematic review.

METHODS: In accordance with PRISMA guidelines, PubMed and Ovid MEDLINE, EMBASE, ISI Web of Science, PsycINFO, the Cochrane Database of Systematic Reviews, and the Cochrane Central Register of Controlled Trials were searched to determine the quality and quantity of longitudinal and cross-sectional research on this topic.

RESULTS: Two prospective longitudinal cohort studies and 30 cross-sectional studies met inclusion criteria. The prospective longitudinal studies evaluated subjects with or without mild cognitive impairment (MCI) while also using olfactory identification testing as part of a neurocognitive evaluation. The first study reported an increased risk of later onset of AD in subjects with baseline hyposmia, whereas the second study suggested a possible relationship between decreased olfaction in participants with MCI and conversion to AD but was inconclusive due to low follow-up rates. Wide variability in the type of olfactory identification test used and the reporting of results precluded meta-analysis. The cross-sectional studies demonstrated a positive association between poorer performance on olfactory identification testing and AD.

CONCLUSIONS: Although there is evidence suggesting an association between decreased olfaction and AD, rigorously designed longitudinal cohort studies are necessary to clarify the value of olfactory identification testing in predicting the onset of AD.

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- Structured summary
- Includes detailed methods section

- PRISMA Checklist elements for including in Methods section of paper

| METHODS | | |
|------------------------------------|----|--|
| Protocol and registration | 5 | Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number. |
| Eligibility criteria | 6 | Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. |
| Information sources | 7 | Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched. |
| Search | 8 | Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated. |
| Study selection | 9 | State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis). |
| Data collection process | 10 | Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators. |
| Data items | 11 | List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made. |
| Risk of bias in individual studies | 12 | Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. |
| Summary measures | 13 | State the principal summary measures (e.g., risk ratio, difference in means). |
| Synthesis of results | 14 | Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis. |
| Risk of bias across studies | 15 | Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies). |
| Additional analyses | 16 | Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified. |

| RESULTS | | |
|-------------------------------|----|--|
| Study selection | 17 | Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. |
| Study characteristics | 18 | For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. |
| Risk of bias within studies | 19 | Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). |
| Results of individual studies | 20 | For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. |
| Synthesis of results | 21 | Present results of each meta-analysis done, including confidence intervals and measures of consistency. |
| Risk of bias across studies | 22 | Present results of any assessment of risk of bias across studies (see Item 15). |
| Additional analysis | 23 | Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]). |
| DISCUSSION | | |
| Summary of evidence | 24 | Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers). |
| Limitations | 25 | Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). |
| Conclusions | 26 | Provide a general interpretation of the results in the context of other evidence, and implications for future research. |
| FUNDING | | |
| Funding | 27 | Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. |

- [PRISMA Checklist](#)
- [Cochrane Handbook](#)

Example Flow Chart



PRISMA 2009 Flow Diagram

Identification

Screening

Eligibility

Included

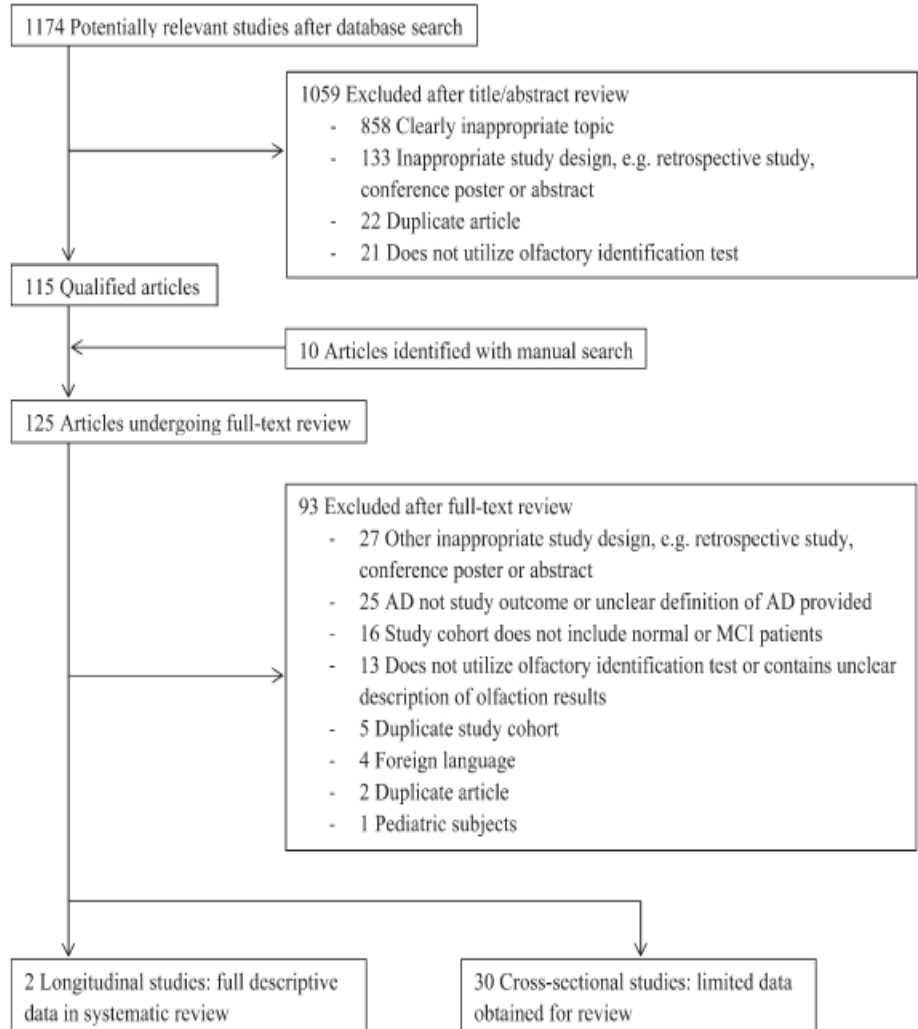
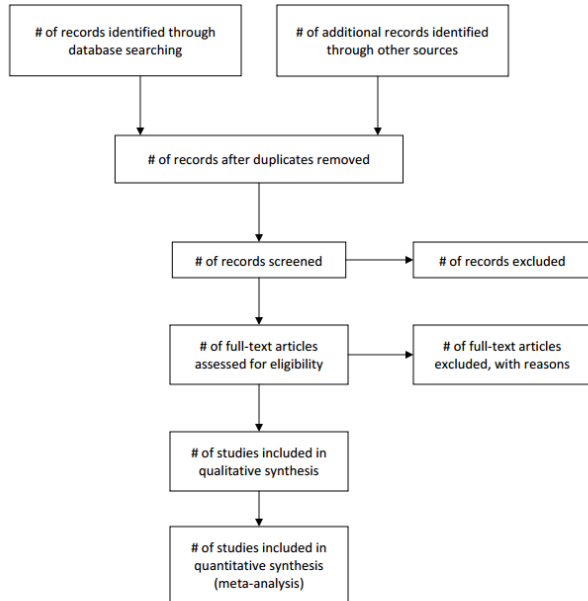


Fig. 1. Study selection flowchart. AD = Alzheimer's disease; MCI = mild cognitive impairment.

DistillerSR - Overview



- DistillerSR's Intuitive 5 Step Process
 - Step 1: Load Your References
 - Step 2: Create Your Forms
 - Step 3: Lay Out Your Workflow and Assign Reviewers
 - Step 4: Monitor and Tune Your Review
 - Step 5: Export Your Results

Following Up

- If you would like to discuss conducting a systematic review and how a librarian can assist, or how to use DistillerSR, please contact either:
 - [Alicia Livinski](#), Informationist, NIDCR
 - [Holly Thompson](#), Informationists, Point of Contact NIDCR

Thank you.