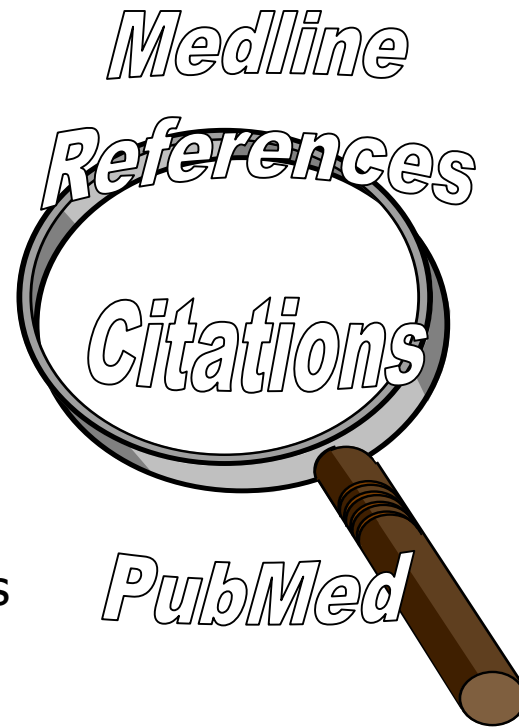


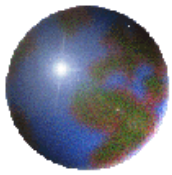
Searching and selecting primary studies



Madhukar Pai, MD, PhD
Associate Professor
Department of Epidemiology & Biostatistics
McGill University, Montreal, Canada
Email: madhukar.pai@mcgill.ca



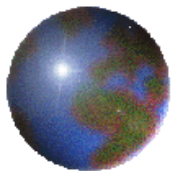
McGill



What makes a good systematic review search?

✚ Systematic approach

- ▣ Clear research question
- ▣ Comprehensive literature search
- ▣ Free of bias (publication bias, language bias)
- ▣ Documentation of search strategies
- ▣ As up-to-date as possible



Standards for Finding and Assessing Individual Studies

STANDARD 3.1

Conduct a comprehensive systematic search for evidence

- 3.1.1 Work with a librarian or other information specialist trained in performing systematic reviews to plan the search strategy
- 3.1.2 Design the search strategy to address each key research question
- 3.1.3 Use an independent librarian or other information specialist to peer review the search strategy
- 3.1.4 Search bibliographic databases
- 3.1.5 Search citation indexes
- 3.1.6 Search literature cited by eligible studies
- 3.1.7 Update the search at intervals appropriate to the pace of generation of new information for the research question being addressed
- 3.1.8 Search subject-specific databases if other databases are unlikely to provide all relevant evidence
- 3.1.9 Search regional bibliographic databases if other databases are unlikely to provide all relevant evidence

STANDARD 3.2

Take action to address potentially biased reporting of research results

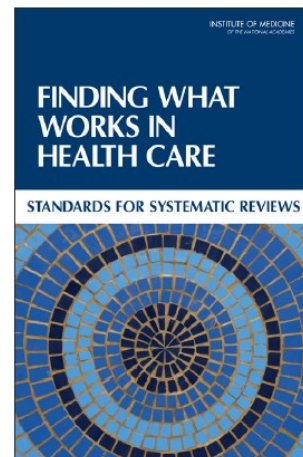
- 3.2.1 Search grey literature databases, clinical trial registries, and other sources of unpublished information about studies
- 3.2.2 Invite researchers to clarify information about study eligibility, study characteristics, and risk of bias

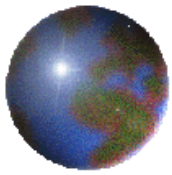
- 3.2.3 Invite all study sponsors and researchers to submit unpublished data, including unreported outcomes, for possible inclusion in the systematic review
- 3.2.4 Handsearch selected journals and conference abstracts
- 3.2.5 Conduct a web search
- 3.2.6 Search for studies reported in languages other than English if appropriate

STANDARD 3.3

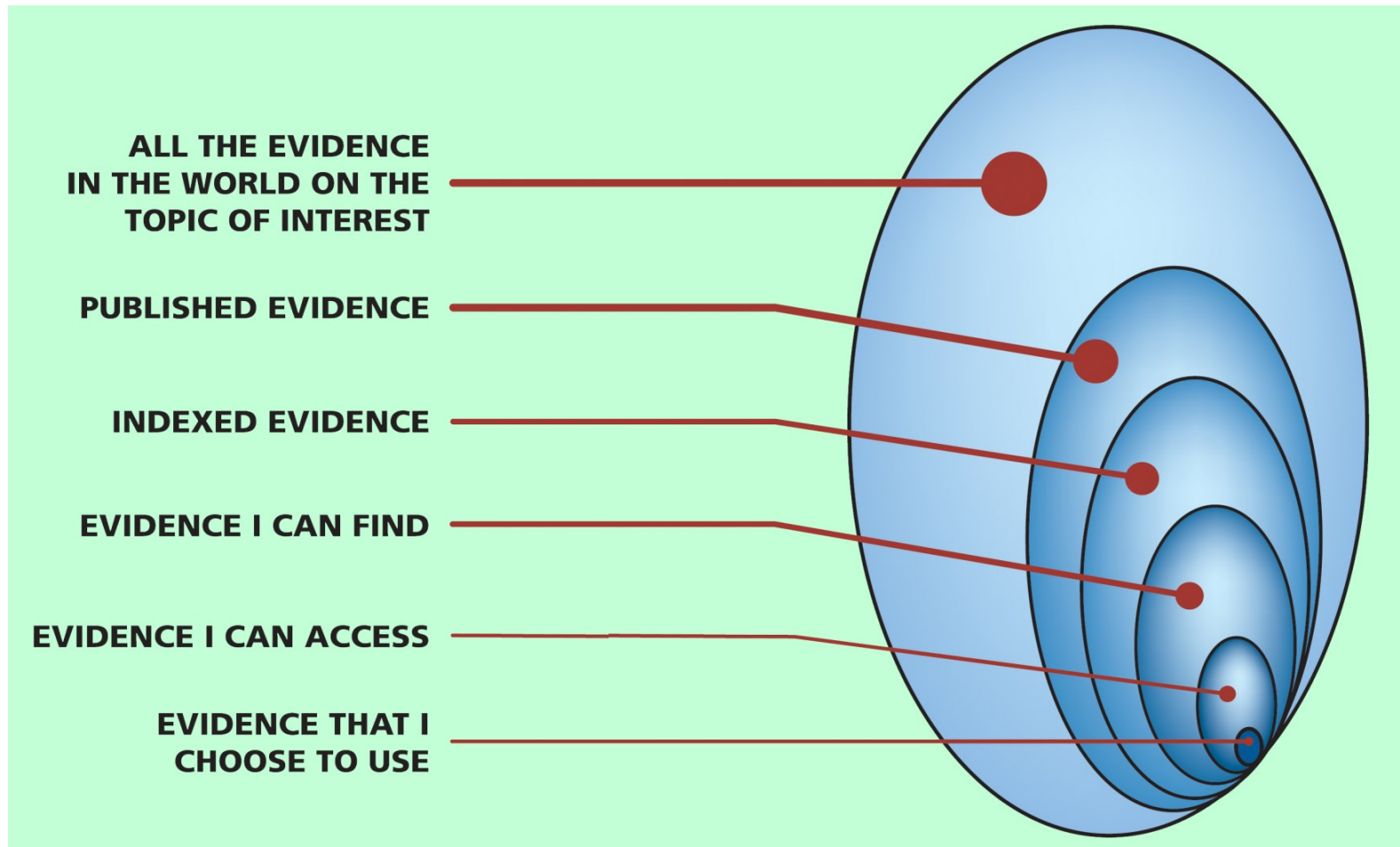
Screen and select studies

- 3.3.1 Include or exclude studies based on the protocol's prespecified criteria
- 3.3.2 Use observational studies in addition to randomized clinical trials to evaluate harms of interventions
- 3.3.3 Use two or more members of the review team, working independently, to screen and select studies
- 3.3.4 Train screeners using written documentation; test and retest screeners to improve accuracy and consistency
- 3.3.5 Use one of two strategies to select studies: (1) read all full-text articles identified in the search or (2) screen titles and abstracts of all articles and then read the full text of articles identified in initial screening
- 3.3.6 Taking account of the risk of bias, consider using observational studies to address gaps in the evidence from randomized clinical trials on the benefits of interventions

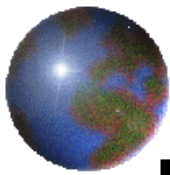




Whatever we do, we are guaranteed to miss studies!

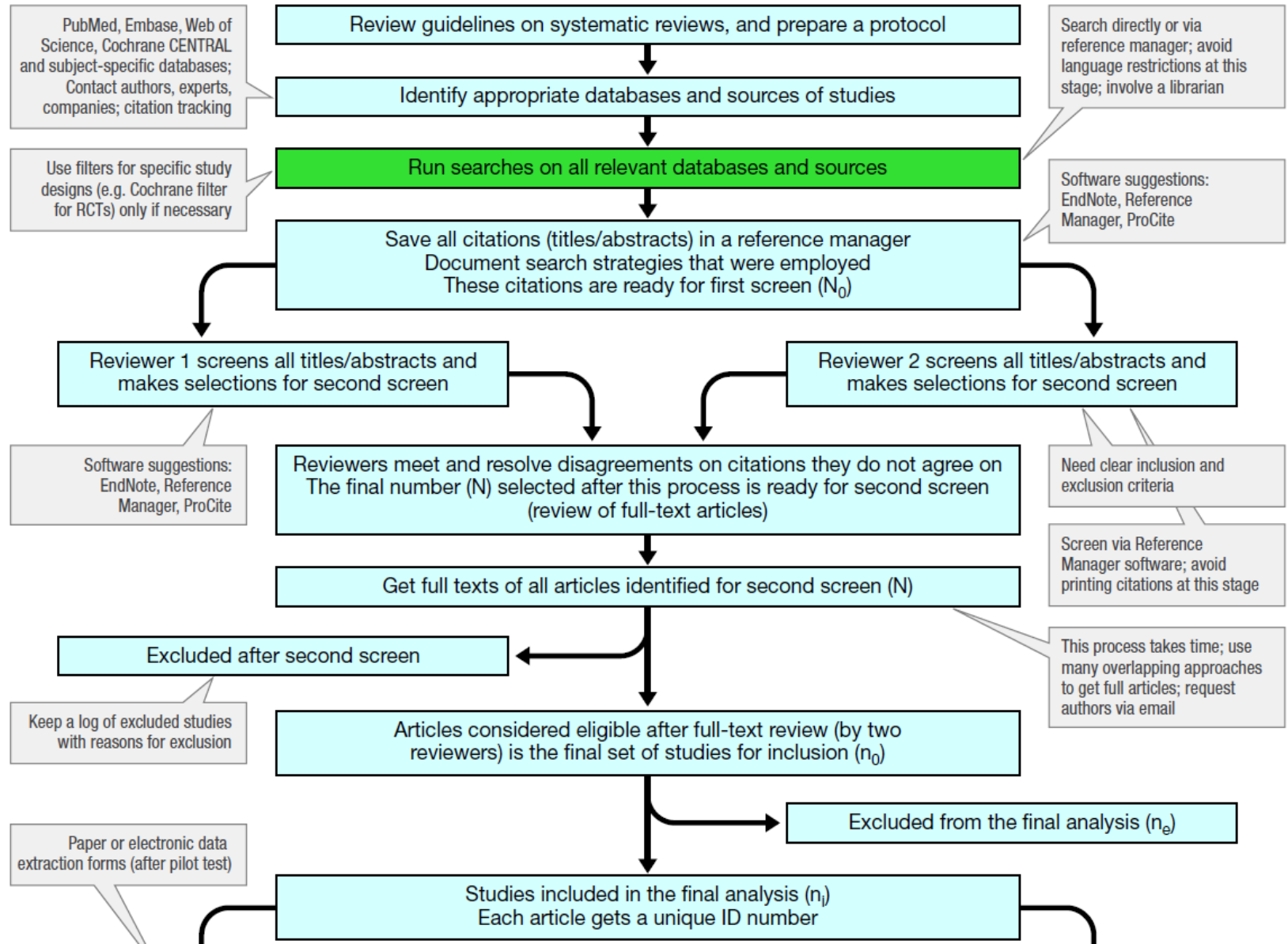


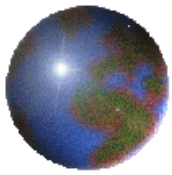
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Steps involved...

Define a focused 4-part review question (Patient, Intervention, Comparison and Outcome)





Sources to search

⊕ Electronic databases:

- General: Cochrane CENTRAL, PubMed, Embase, etc.
- Subject-specific: AIDSLINE, CANCERLIT, PsycInfo, ERIC, Global Health, etc.

⊕ Reference lists of included studies

⊕ References lists of earlier reviews, commentaries

- ⊞ CDSR, DARE, PubMed search with filters for systematic reviews

⊕ Personal communication with experts and authors

⊕ Contacting drug/device companies

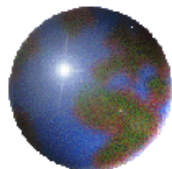
⊕ Handsearching of key, high-yield journals

⊕ Grey literature

- ⊞ Dissertation abstracts, reports, conference proceedings, etc.

⊕ Sources of ongoing trials

- ⊞ Trial registers, drug companies, contacting experts



Guides to Conducting & Reporting Systematic Reviews

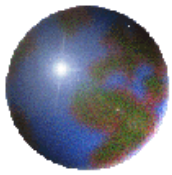
Systematic Reviews Wiki: A Guide to Library Resources at McGill
http://wikisites.mcgill.ca/systematicreview/index.php/Main_Page

Finding What Works in Health Care: Standards for Systematic Reviews
<http://www.iom.edu/Reports/2011/Finding-What-Works-in-Health-Care-Standards-for-Systematic-Reviews.aspx>
Institute of Medicine of the National Academies
McGill Life Sciences Library W 84.3 I59f 2011

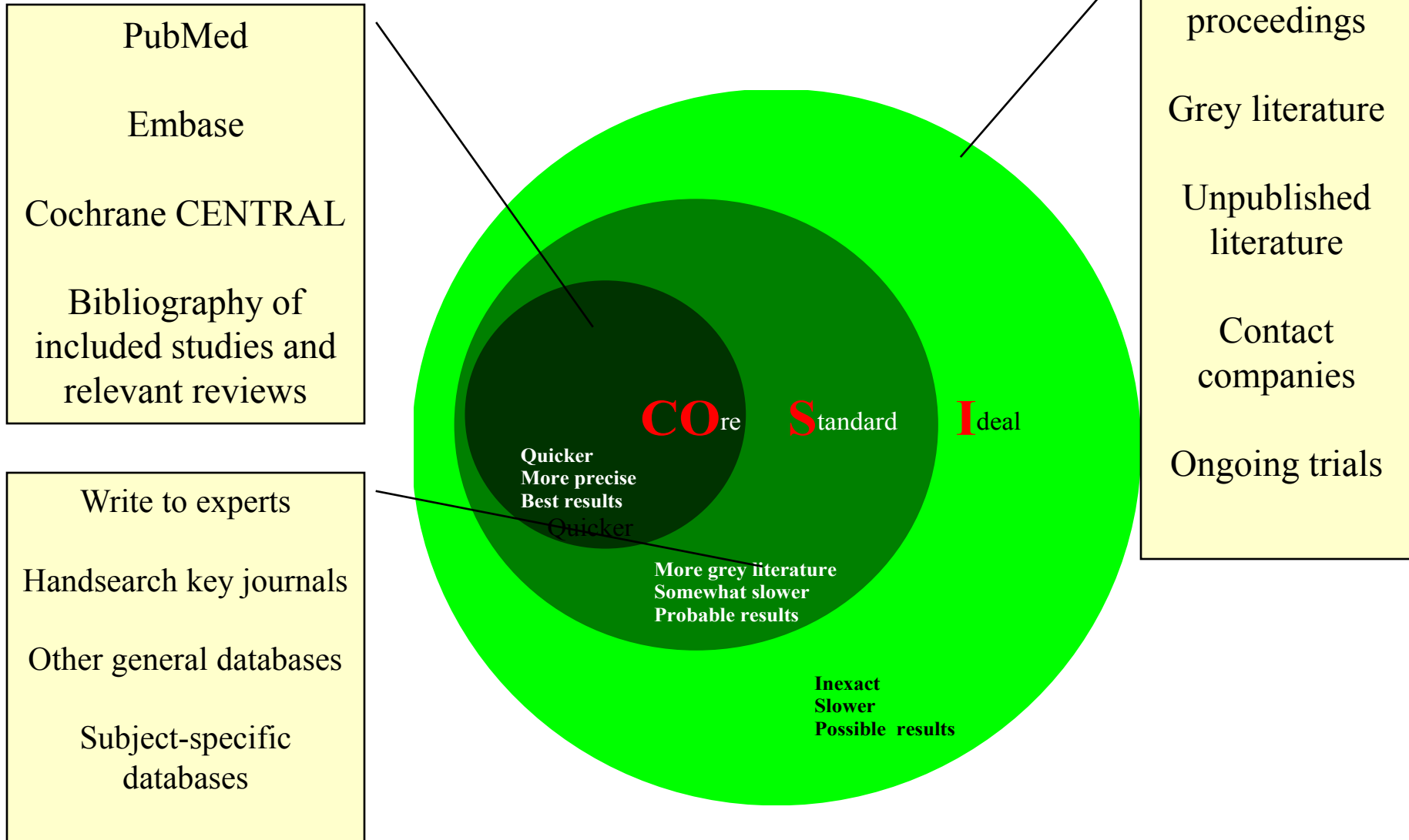
PRISMA: Transparent Reporting of Systematic Reviews and Meta-Analyses
<http://www.prisma-statement.org/statement.htm>

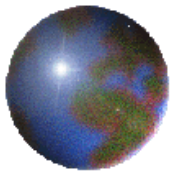
Databases for Primary Literature & Clinical Trials in Life Sciences

	Access	Export to Citation Software?
General Health Sciences Databases → Consider these resources first		
Cochrane Library Includes Cochrane Database of Systematic Reviews (reviews and protocols)	McGill Only	Direct
Database of Abstracts of Reviews of Effects (DARE) For systematic reviews	Free to All	Filter required
EMBASE 1996- or EMBASE Classic + Embase, 1947- Emphasis on European and Near-Eastern publications; drug literature	McGill Only	Direct
Google Scholar Grey and published literature	Free to All	Requires configuration of GS
MEDLINE [via PubMed] or [via Ovid Online] Biomedical journal articles; emphasis on United States	Free to All	PubMed: Import MEDLINE file Ovid: direct
ProQuest Dissertations and Theses For locating master's and doctoral research	McGill Only	Direct
Web of Science Multi-disciplinary	McGill Only	Direct



A suggested COSI strategy...





Cochrane Library

✚ Cochrane Database of Systematic Reviews

- ✚ contains more than 4000 systematic reviews and more than 1900 protocols

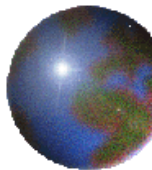
✚ Controlled Trials Register (Central)

- ✚ contains citations to more than 600,000 clinical trials identified by Cochrane collaboration

✚ DARE (Database of Reviews of Effectiveness)

- ✚ >6000 systematic reviews

CDSR had an impact factor of 5.9 in 2011



SEARCH THE COCHRANE LIBRARY

Title, Abstract or Keywords

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Notice to all users: The April issue of *The Cochrane library* is now live. **Please note:** there is a delay in the April publication of the *Cochrane Central Register of Controlled Trials* (CENTRAL). We anticipate publication in the next 7 -14 days. Users can still search records published in the January issue. We apologise for any inconvenience this may cause.

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[Cancer](#) (252)

[Consumers & communication](#) (29)

[Dentistry and oral health](#) (107)

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COCHRANE CENTRAL REGISTER OF CONTROLLED TRIALS

[Search for trials](#)

BROWSE OTHER RESOURCES

The Cochrane Library has a wide range of resources:

SPECIAL COLLECTIONS



World Malaria Day (25 April 2010)



World Asthma Day (4 May 2010)



Cochrane Evidence Aid: resources for Chile and Haiti earthquakes

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EDITORIAL



"Inadequate control despite regular treatment with inhaled corticosteroids." It's a scenario repeated all over the world in surgeries and outpatients departments, anywhere where people with asthma are routinely treated. Health professional and patients are faced with a familiar problem: increase the dose of corticosteroids or add a new agent, such as an inhaled long-acting beta-agonist (LABA). Which is best?...

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[Legislative smoking bans for reducing secondhand smoke exposure, smoking prevalence and tobacco consumption](#)

[Aspirin with or without an antiemetic for acute migraine headaches in adults](#)



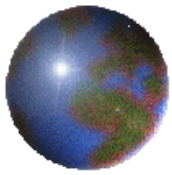
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[Indoor residual spraying for preventing malaria](#)



[Self-monitoring and self-management of oral anticoagulation](#)

[Exercise based rehabilitation for heart failure](#)



Medline/PubMed

- ✚ Includes >21 million citations and abstracts from more than 4300 journals, extends back to 1948
- ✚ PubMed version is very current with new data being added weekly
- ✚ Old Medline extends from 1958-1965
- ✚ Print Index Medicus extends back to 1879
- ✚ Strong North American focus (52% of journals are from US)



PubMed

PubMed comprises more than 22 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher web sites.

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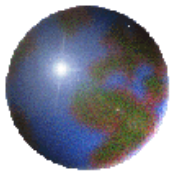
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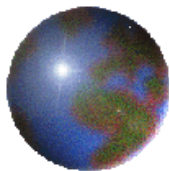
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Embase

- ✚ EMBASE.com is a biomedical and pharmacological bibliographic database
- ✚ It contains over 19 million indexed records from 7,000+ peer reviewed journals, covering 1947 to date, with more than 600,000 additions annually.
- ✚ Strong coverage of the drug literature
- ✚ Overlap with Medline averages 34% but can vary from 10%-70% depending on topic
- ✚ Approximately 30% of journals indexed are North America



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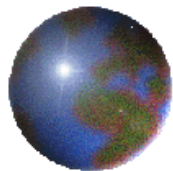
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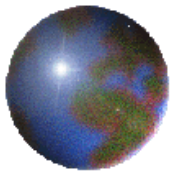
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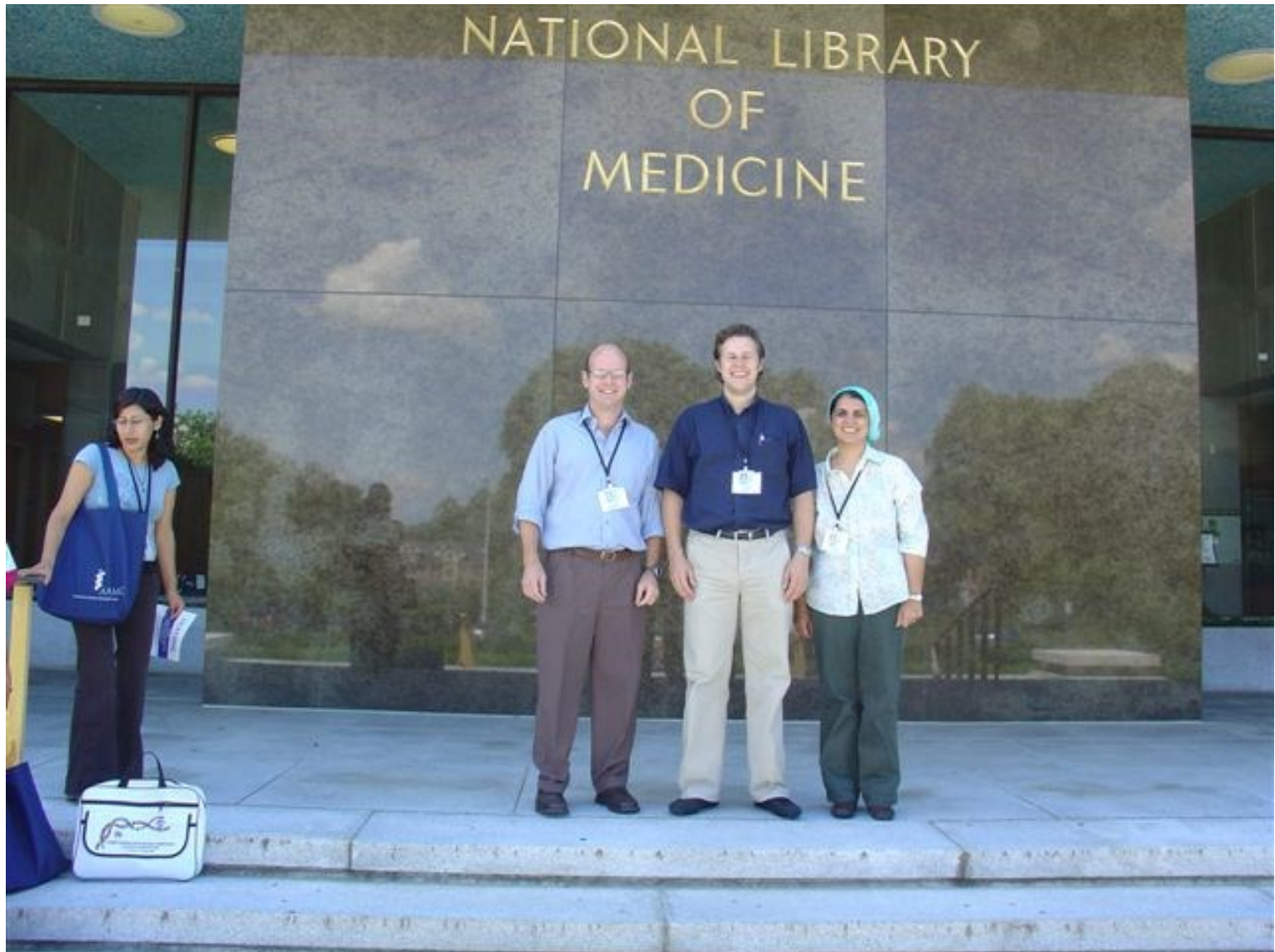
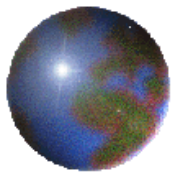
EMBASE

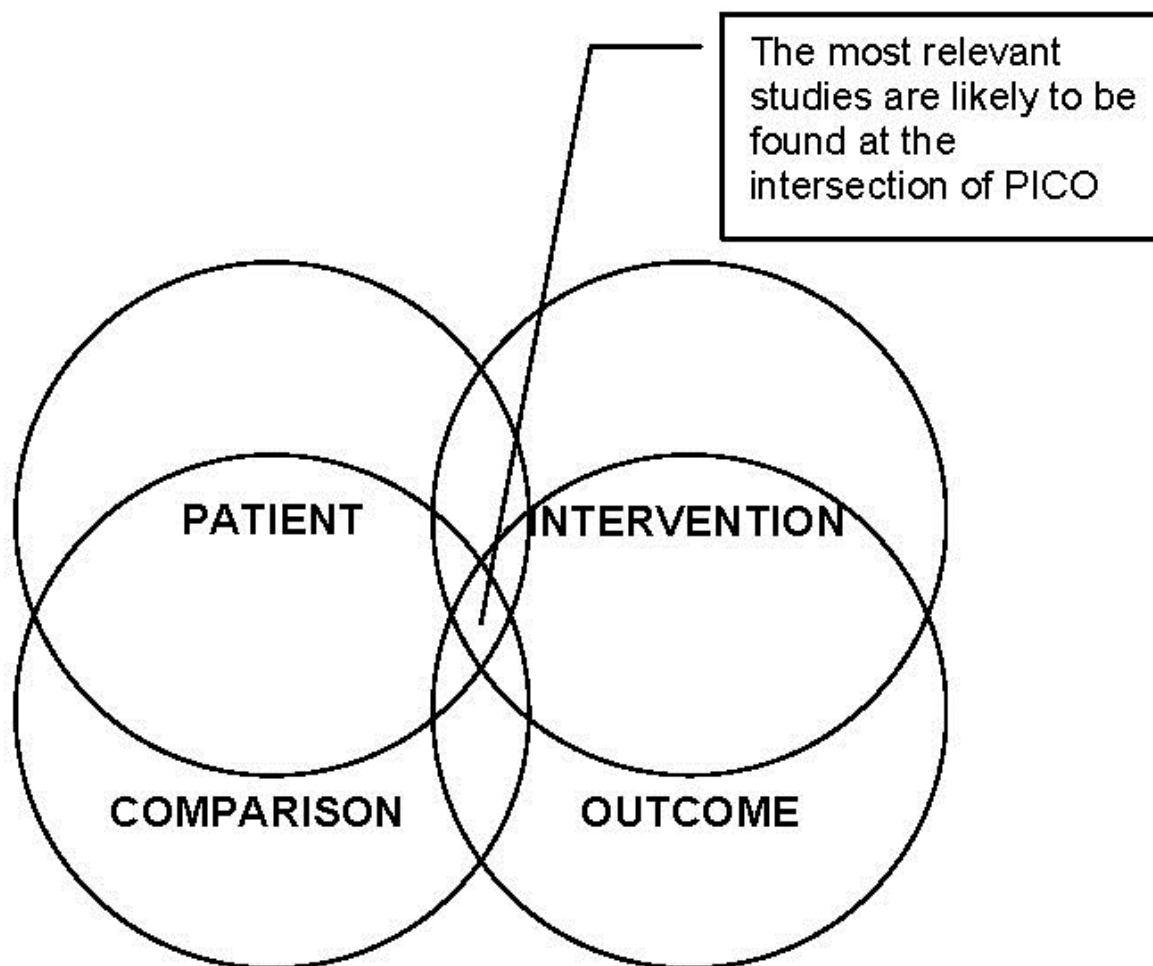
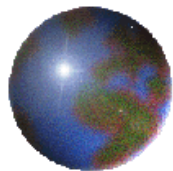




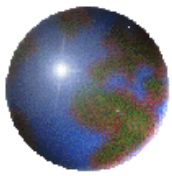
To tame the beast

- ✚ Learn the controlled vocabulary of each database
 - ▣ Learn to use MeSH or equivalent subject headings and textwords for most effective searching
- ✚ Learn to perform multiple overlapping searches and “cross” them using Boolean operators
- ✚ Learn to use limits and study design filters to focus the search
- ✚ Involve a librarian who is familiar with the database





OVERALL SEARCH STRATEGY = PICO + FILTERS FOR STUDY DESIGNS



Other electronic databases

General:

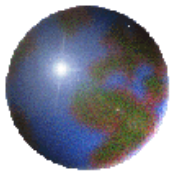
- Web of Science
- Biosis
- LILACS
- DARE
- Google Scholar

Subject-specific:

- CINAHL
- PsycINFO
- ERIC
- CANCERLIT
- TOXNET
- AIDSLINE
- Global Health

The screenshot shows the ISI Web of Knowledge homepage. At the top is a green navigation bar with the text "ISI Web of KnowledgeSM" and a dropdown menu for "Products & Features" with a "GO" button. Below the bar, there is a green checkmark icon and the text "Take the next step with ISI Web of Knowledge". A link "Science." is visible. Below this, a message states "Information when and how you want it. Click [here](#) for more information. Click [here](#) to view recorded training." To the right, there is a link "More information for new users" with a "click here" button. The main content area is divided into several sections: "CrossSearch" with a search bar and "SEARCH" button; "Searchable Database Products" listing "Web of Science", "Derwent Innovations Index", and "Web Citation Index"; "Analytical Tools" listing "Journal Citation Reports"; "Other Resources" listing "ISI HighlyCited.com", "BiologyBrowser", and "Index to Organism Names". On the right side, there is a "Sign In" section with fields for "E-mail Address" and "Password", a "Remember me on this computer" checkbox, and a "SIGN IN" button. Below this is a "Citation Alerts" section with a "View My Cited Articles List" link, and a "My EndNote Web" section with a "Sign in to access EndNote Web" link.

See guide in the USB key

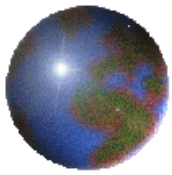


Reference lists

- ✚ Check bibliographies of relevant articles
- ✚ Also check references from existing reviews & meta-analyses

Handsearching

- ✚ Not all journals are indexed in databases
- ✚ May be incorrectly indexed
- ✚ Journals may be indexed selectively
- ✚ Select one or more “high-yield” journals in your topic area and “handsearch” it

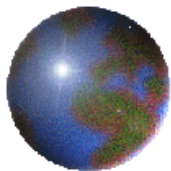


Personal communication

- ✚ Personal communication with colleagues
- ✚ Contact experts in subject area
- ✚ Contact pharmaceutical companies or CROs
 - ✚ Might be very useful for drug trials and diagnostic assays

Grey literature

- ✚ Hard to track down, much is unpublished
- ✚ Includes conference papers, dissertations, government reports, proceedings, technical reports, house journals, corporate documents, research reports



Good source of ongoing trials

ClinicalTrials.gov

A service of the U.S. National Institutes of Health

[Home](#) [Search](#) [Study Topics](#) [Glossary](#)

ClinicalTrials.gov is a registry and [results database](#) of federally and privately supported clinical trials conducted in the United States and around the world. ClinicalTrials.gov gives you information about a trial's purpose, who may participate, locations, and phone numbers for more details. This information should be used in conjunction with advice from health care professionals. [Read more...](#)

► [Search for Clinical Trials](#)

Find trials for a specific medical condition or other criteria in the ClinicalTrials.gov registry. ClinicalTrials.gov currently has **126,245 trials** with locations in **179 countries**.

► [Investigator Instructions](#)

Get instructions for clinical trial investigators/sponsors about how to register trials in ClinicalTrials.gov. Learn about mandatory registration and results reporting requirements and US Public Law 110-85 (FDAAA).

► [Background Information](#)

Learn about clinical trials and how to use ClinicalTrials.gov, or access other consumer health information from the US National Institutes of Health.

Resources:

[Understanding Clinical Trials](#)

[What's New](#)

[Glossary](#)

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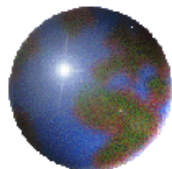
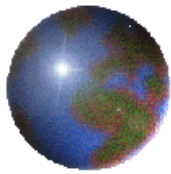


Table 1| Potential sources of unpublished information on trial methods and results

Source	Potential information	Strengths	Limitations
Trial registries (non-industry)	Methods: Basic Results: Summary	Broad scope of trials (ongoing, completed, any intervention) Standardised core content Free accessibility Searchability Audit trail of changes to registry entries Potential posting of full protocols	Lack of universal adherence mechanism Variable quality of information Limited methodological information Limited availability before 2005
Results database (ClinicalTrials.gov)	Methods: Basic Results: Summary	Standard format and content Legislative enforcement for applicable trials	Lack of universal adherence mechanism Limited availability before 2008
Trial registries and results databases (industry)	Methods: Basic Results: Summary	Free accessibility Searchability Potential posting of full protocols Availability of older trials for select drugs	Limited to marketed drugs Lack of external oversight Variable format, quality, and content
Regulatory agency online databases	Methods: Basic Results: Summary	Availability of all trials for most approved drugs Database searchability Disclosure supported by legislation	Variable format and content Redacted content Limited methodological information Limited to drug trials
Regulatory agency submissions (on request)	Methods: Full protocol Results: Clinical study report	Availability of all trials for approved drugs and devices Detailed methods and results Disclosure supported by legislation	Potential for lengthy delays Request may be rejected Redacted content Limited to drug and device trials
Trialist and sponsor contact	Methods: Full protocol Results: Variable	Detailed methods and results Opportunity to correspond about specific issues	Burdensome Variable response rates
Litigation documents	Methods: Full protocol Results: Clinical study report	Detailed methods and results	Request may be rejected Unclear accessibility for external researchers
Conference abstracts	Methods: Basic Results: Limited	Not restricted by intervention type	Difficult to find Limited methodological information and results
Internet search	Methods: Full protocol Results: Not applicable	Ease of use Short completion time	Variable yield



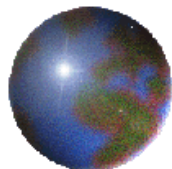
Documenting your search

_____ [Title] _____ : A systematic review
[Author(s)]

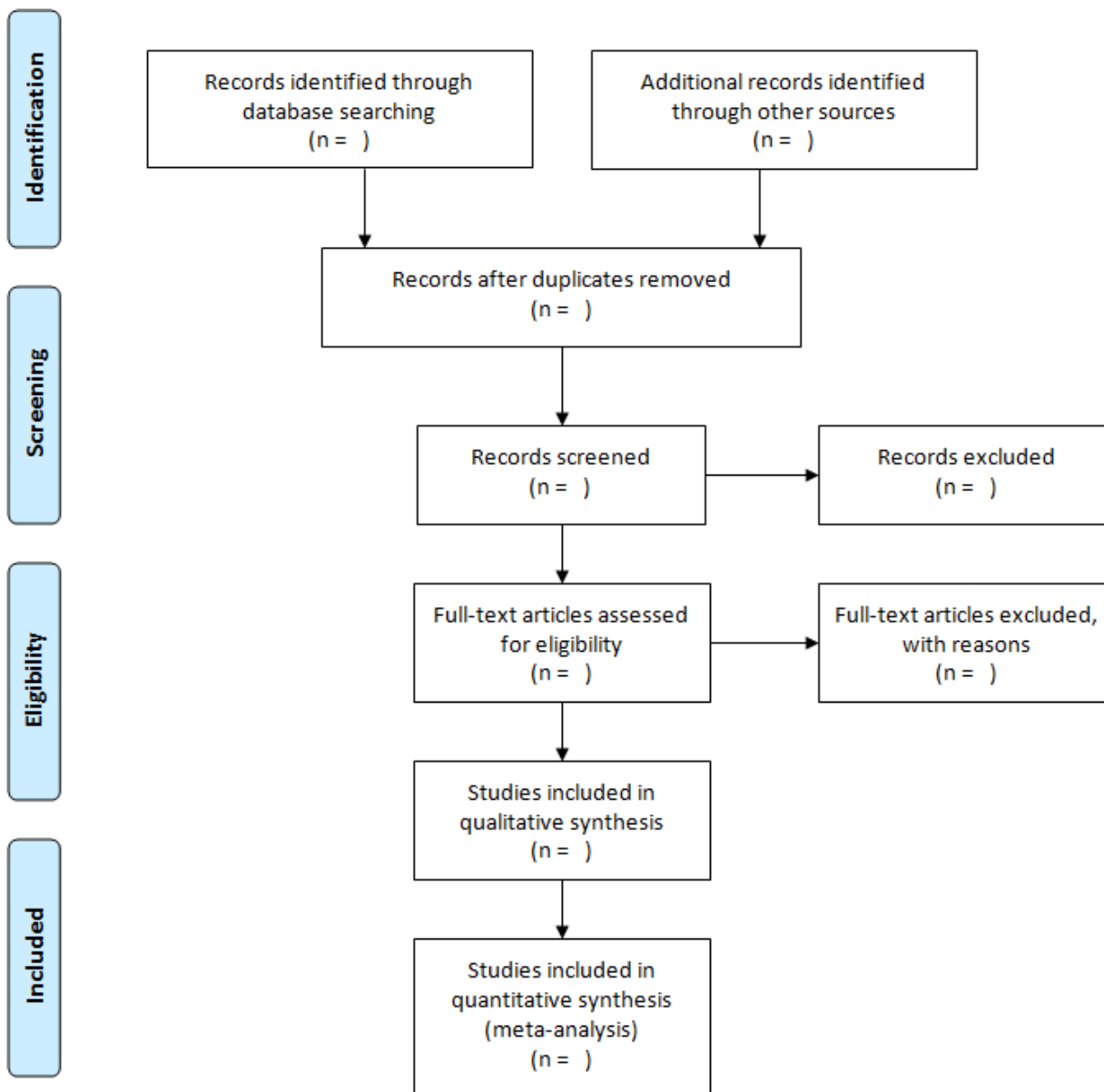
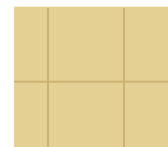
Literature Search

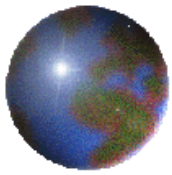
Document updated: [date] by [name(s)]
Search strategy peer reviewed: [date] by [name(s)]
Database searches conducted: [date] by [name(s)]
Grey Literature searches conducted [date] by [name(s)]

Databases/Trial registry	Platform	Dates	Notes
Cochrane Library	Cochrane Library		Includes Cochrane Reviews, CENTRAL, DARE
EMBASE Classic + EMBASE	OvidSP	1947-present	
MEDLINE	PubMed	1946-present	
ProQuest Dissertations & Theses (PQDT)	ProQuest	1861-present	



PRISMA 2009 Flow Diagram





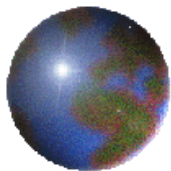
There is only one way to keep track of all the citations and study selection process

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Manager

EndNote®
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 RefWorks

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<http://systematic-review.net/>

DISTILLERSR

Web-Based Systematic Review Software

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DistillerSR is an **online application designed specifically for the screening and data extraction** phases of a systematic review.

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- Eliminate the costly human errors associated with transcription, promotion and reference distribution. It's all handled by the system.
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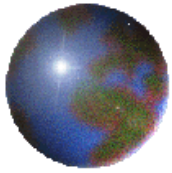
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