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Literature and Systematic Review: Do it right the first time

Renly Lim, MPharm, PhD
University of South Australia
Twitter @DrRenly

/IPSForg

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IPSF is the leading international advocacy organization for pharmaceutical students and recent graduates, promoting improved public health through provision of information, education, networking and a range of publications and professional initiatives



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Internships

**Pharmaceutical
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Webinars



Educational and scientific poster competitions



Research

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**Pharmacy Practices
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Webinar Instructions

Mute Your Microphone at all times

Introduce yourself on the chat box with Name, Country

All Questions will be taken at the end of the Speakers Presentation –
Kindly type all questions in the chat box during the presentation

Fill in the evaluation form at the end of webinar: Only those who fill the post webinar evaluation form will get a Certificate at the end of the webinar

Introduction of Speaker



Ms. Renly Lim is a **pharmacist** and a **research fellow** at the Quality Use of Medicines and Pharmacy Research Centre at the University of South Australia, Adelaide.

Renly was born and grew up in Malaysia. She completed her pharmacy degree in Scotland, her PhD in Malaysia, and has work experience in the UK, Malaysia, Thailand and Cambodia.

She is the University of South Australia Early Career Representative and currently the President-Elect of the International Pharmaceutical Federation (FIP) Young Pharmacists' Group.

Her research interest includes medication safety, digital health, health program evaluation and community engagement.

Content

Basics

How to

Useful
resources

Q&A

The Basics

What is the literature?

Primary source

- Original research, conference papers, interviews, raw data, reports

Secondary source

- Reviews, commentaries, opinion pieces, books

Tertiary source

- Based on primary and secondary sources e.g. handbooks, guidelines, standards

The Basics

Review

- Secondary source; do not report new or original experimental work

Literature review

- Provide summary or overview of a topic (general or specific)

Systematic review

- Comprehensive review which synthesizes ALL research evidence relevant to the specific topic of interest
- Clear objectives identified; explicit and reproducible search strategy



Laborious task!



What's out there

Elsevier (2015)

- 1.8 million unique authors submitted **1.3 million manuscripts** (estimated 7.8 million active researchers in 2015)
- **400,000 manuscripts published** in 2,500 active journals

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Benefits

- Gain **deeper understanding** in your field of interest
- Identify **relevant journals** if working on research project
- Get insight into **current trends** and identify **opportunities**
- Conference **abstracts**, peer-reviewed **publications**
- **Grant proposals** for funding application

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Hierarchy of evidence



Before you start

Things to keep in mind

- Start with the question
- Scope of project
- Time
- Resources
- Conference/publication



How to



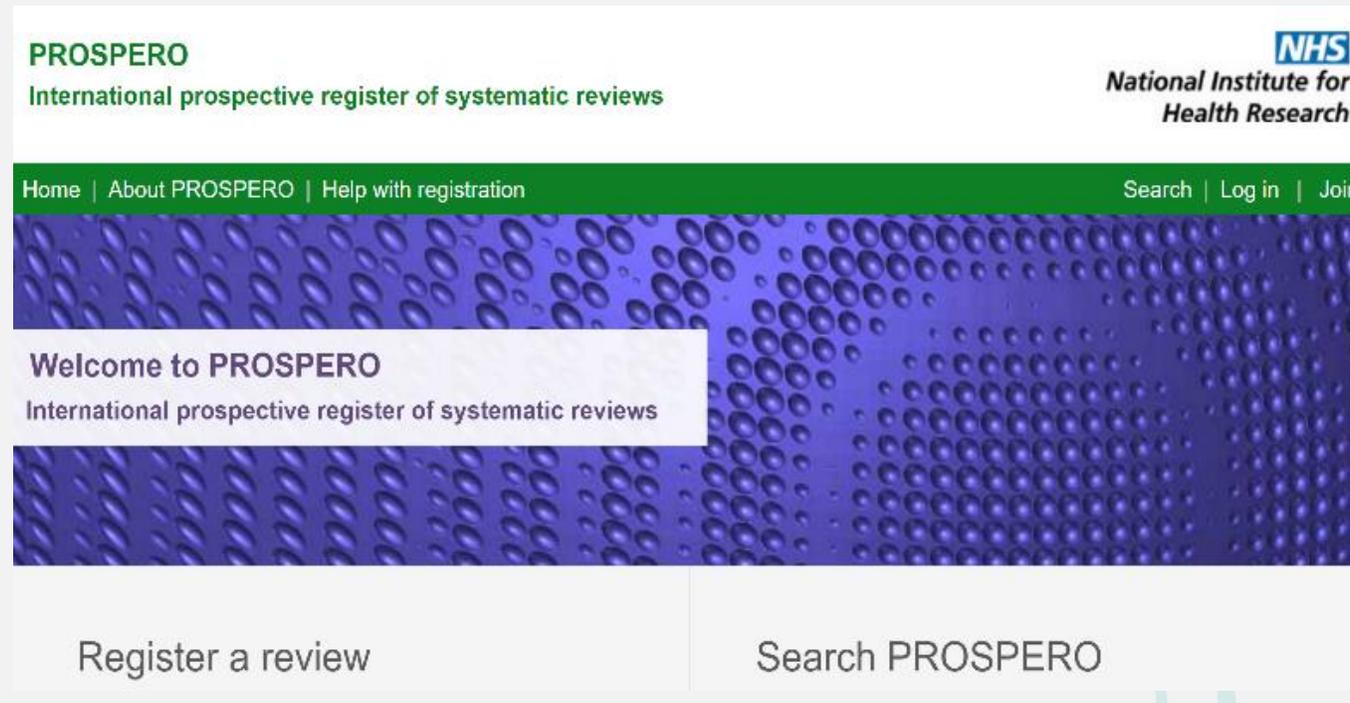
Once you know your question.....

- **Systematic review** - Done according to a fixed plan or system
- **Protocol**
 - Formulate the question – focused, plan the review
 - Eligibility criteria – method, population, design
 - Comprehensive search – search strategy, search terms
 - Selection and extraction
 - Critical appraisal
 - Data synthesis (including meta-analysis)
 - Interpretation of results and writing up
- **Comprehensive, reproducible, transparent**



Protocol registration e.g. PROSPERO

- Search for ongoing reviews
- Register planned review online (& update as work progresses)
- Avoids duplication of reviews



Comprehensive search



Where to search?

Electronic databases according to the topic area

- MEDLINE, EMBASE, Cochrane databases, PsycInfo, etc.

Grey literature

- dissertations, theses, conference proceedings, national bodies, government reports, census, books etc

Clinical trial database (www.clinicaltrials.gov/)

Check existing systematic reviews in a similar area for ideas

Comprehensive search – Search terms

- Broad but defined, systematic sweep
- Compile a list of search terms for **each** component
 - Words and phrases that are related
 - Words that are broader
 - Words that are more focused



Comprehensive search – Search terms

Thesaurus headings (e.g. MeSH in Medline)

- Controlled vocabulary thesaurus used for indexing articles
- Standardised search terms regardless of how author has described the study
- Each database has a different thesaurus – must translate

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Comprehensive search – Search terms

The screenshot displays the PubMed Advanced Search Builder interface. At the top, there are navigation links for "NCBI", "Resources", and "How To", along with a "Sign in to NCBI" button. Below this, there are links for "PubMed Home", "More Resources", and "Help". The main heading is "PubMed Advanced Search Builder".

The search input field contains the text "dementia[MeSH Terms]". Below the input field, there are "Edit" and "Clear" buttons. The "Builder" section includes a dropdown menu for "MeSH Terms" (indicated by a red arrow), a dropdown for "AND", and a dropdown for "All Fields". There are "Search" and "Add to history" buttons.

The "History" section shows a table with columns "Search", "Add to builder", and "Search #". The first entry is "#5" with an "Add" button.

A dropdown menu is open, showing a list of search terms related to "dementia". The terms include: "dementia", "acquired immune deficiency syndrome dementia", "acute confusional senile dementia", "acute onset vascular dementia", "aids dementia complex", "aids related dementia complex", "alzheimer dementia, presenile", "alzheimer type dementia", "alzheimer type senile dementia", "amyotrophic lateral sclerosis parkinsonism dem...", "amyotrophic lateral sclerosis with dementia", "amyotrophic lateral sclerosis, parkinsonism de...", "arteriosclerotic dementia", "arteriosclerotic dementias", "autism dementia ataxia loss of purposeful hand...", "autism, dementia, ataxia, and loss of purposefu...", "complex, aids dementia", "complex, aids related dementia", "delirium, dementia, amnestic, cognitive disorders", "dementia", and "dementia complex, acquired immune deficiency...".

On the right side, there are links for "Show index list" and "Download history". A table shows "Items found" as 497 and "Time" as 03:21:28. At the bottom right, there is a "Support Center" link.

The footer contains navigation links for "GETTING STARTED" (NCBI Education, NCBI Help Manual, NCBI Handbook, Training & Tutorials, Submit Data) and "RESOURCES" (Chemicals & Bioa, Data & Software, DNA & RNA, Domains & Struct, Genes & Express, Genetics & Medic).

At the bottom right, there is a "NCBI INFORMATION" section with links for "About NCBI", "Research at NCBI", "NCBI News & Blog", "NCBI FTP Site", "NCBI on Facebook", and "NCBI on Twitter".

Comprehensive search – Search terms

Keywords

- Also search title and abstract fields in case of imprecise or non existent indexing

Truncated search words and wild cards (*, \$, ?, #)

- Medic* = medication, medicine, medicines

Boolean logic

- Use OR, NOT, AND to be specific in search
e.g. dementia NOT stroke

Comprehensive search – Search terms

Different databases use different types of controlled vocabulary

- Same citations indexed differently on different databases
- Medline and EMBASE use a different indexing system for study type
- PsycINFO does not have specific terms to identify study types

→ **Need to develop search strategy for each database**

Cheat sheet

The screenshot shows the Google Scholar homepage in a Mozilla Firefox browser window. The browser's address bar displays 'scholar.google.com'. The page features the Google Scholar logo, a search input field with a 'Search' button, and links for 'Advanced Scholar Search' and 'Scholar Preferences'. Below the search area, there are radio buttons for 'Articles' (selected) and 'Legal opinions and journals', with a checked box for 'include patents'. The page also displays the slogan 'Stand on the shoulders of giants', a 'New!' announcement for 'Google Scholar Citations open to all', and navigation links for 'About Google Scholar', 'About Google', and 'My Citations'. The footer shows the copyright notice '©2011 Google'.

Cheat sheet

Look for popular article - citations
Relevant articles

The screenshot shows a Google Scholar search interface. The search bar at the top contains the text "The diagnosis of dementia due to Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association". Below the search bar, the results are displayed. The first result is highlighted with a red box and a red arrow pointing to it from the right. The result title is "The diagnosis of dementia due to Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association". Below the title, the authors are listed as "MS Albert, ST DeKosky, D Dickson, B Dubois...". The abstract is partially visible, starting with "Abstract The National Institute on Aging and the Alzheimer's Association charged a workgroup with the task of developing criteria for the symptomatic predementia phase of Alzheimer's disease (AD), referred to in this article as mild cognitive impairment due to AD ...". The citation count is shown as "Cited by 4437".

Google Scholar

Articles About 5,778 results (0.05 sec)

The diagnosis of dementia due to Alzheimer's disease: Recommendations from the National...

Search within citing articles

[HTML] The diagnosis of mild cognitive impairment due to Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association ...
MS Albert, ST DeKosky, D Dickson, B Dubois... - Alzheimer's & ..., 2011 - Elsevier
Abstract The National Institute on Aging and the Alzheimer's Association charged a workgroup with the task of developing criteria for the symptomatic predementia phase of Alzheimer's disease (AD), referred to in this article as mild cognitive impairment due to AD ...
☆ 99 Cited by 4437 Related articles All 47 versions Web of Science: 2706

[HTML] Toward defining the preclinical stages of Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association workgroups on ...
RA Sperling, PS Aisen, LA Beckett, DA Bennett... - Alzheimer's & ..., 2011 - Elsevier
The pathophysiological process of Alzheimer's disease (AD) is thought to begin many years before the diagnosis of AD dementia. This long "preclinical" phase of AD would provide a critical opportunity for therapeutic intervention; however, we need to further elucidate the link ...
☆ 99 Cited by 3633 Related articles All 40 versions Web of Science: 2266

Cited 5778
times

Where to download?

- Online library
- Hard copies of books and journals
- Interlibrary loan
- Online search - Google scholar, ResearchGate
- Contact author



Save your references!

- Keep a record of the literature you collect
- Use a citation manager program like RefWorks or EndNote
- Record **when** you did the search
- Record **where** you retrieved the information

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Search Log

Date	Database	Keywords	Results
10/3/2020	Medline	Dementia, nursing home, medicine error etc	479 articles
10/3/2020	Embase		2173 articles
10/3/2020	Scopus		557 articles

Selection and extraction

Title screening

Pilot a data extraction form

- Two independent persons extract data

Collect the following information

- Citation details to identify the study
- Characteristics of population/intervention
- Methodological details according to chosen critical appraisal tool
- Study outcomes

Selection and extraction

Extract **sufficient** information

- to describe studies
- to allow you to undertake the planned analysis
- so you do not need to return to the full text papers

But **not too much**

- Don't waste time extracting 'nice to have' but unnecessary detail



Critical appraisal

Not all published and unpublished literature is of satisfactory methodological rigour

- Just because it is published in a peer-reviewed journal does not mean it is sound!

Quality may be used as an explanation for differences in study results

Guide the interpretation of findings and aid in determining the strength of inferences

Critical appraisal

Quantitative studies

- Internal validity
- Bias: selection; performance; detection; attrition; reporting
- External validity

Better to use domain based assessment not numerical scores

- Cochrane Risk of Bias 2.0 – RCTs (Higgins 2016)
- QUADAS 2 – diagnostic accuracy (Whiting 2006)
- ROBIS for systematic reviews (Whiting 2016)

Data synthesis

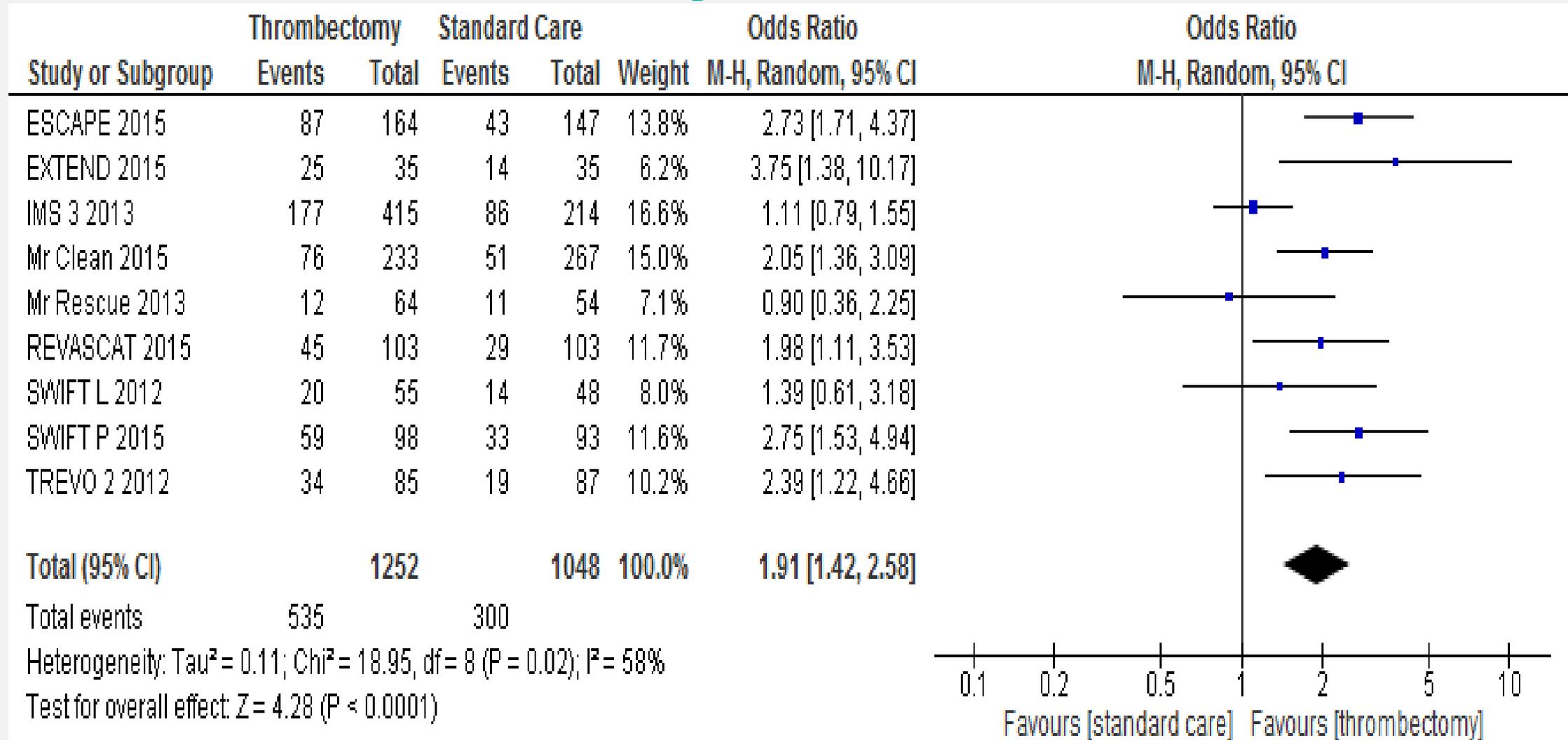
Results from different studies types need to be synthesised appropriately

Quantitative data

- Tables to compare
- Descriptive synthesis
- Meta-analysis (if enough homogeneity in interventions/ outcomes/ study designs)



Data synthesis



Writing up - PRISMA checklist

To ensure you have covered all the points in conducting a systematic review

- compare what you plan to do against the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA)
- PRISMA checklist (previously QUOROM)

Interpretation of results & writing up

- Write methods clearly – replicable
- Organise results in a logical flow
- Discuss what has been published
- What's the conclusion
- Proof read and revise



Useful resources

Resources to get you started:

- University of South Australia guide on systematic review
<https://guides.library.unisa.edu.au/c.php?g=524373&p=6337522>
- Pubmed Tutorial
https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/020_700.html
- Cochrane Training <https://training.cochrane.org/handbooks>
- PRISMA checklist <http://prisma-statement.org/PRISMAStatement/Checklist>
- University librarian!

Systematic Reviews

This guide was developed with the assistance and expertise of Dr Anna Phillips, Dr Saravana Kumar, and Dr Shylie Mackintosh, from the UniSA School of Health Sciences.



Systematic Review Overview



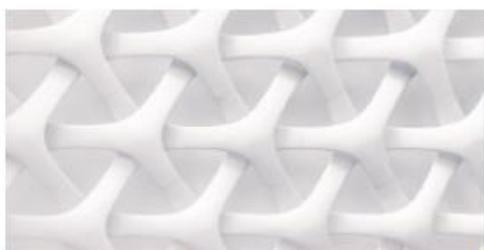
Define Question



Protocol



Search



Screen



Critical Appraisal



Data Extraction



Data Synthesis

Other Review Types

Other review types

What review to choose?

Choose carefully the review type that will match the purpose and scope of your research. It is vital you have a clear understanding of what is involved when undertaking a particular type of review.

Follow relevant standards and adhere to best practice methods as outlined in this guide

	Scoping Review	Systematic Review	Narrative Literature Review
What is it?	Rapid gathering of literature in a given policy or clinical area where the aims are to accumulate as much evidence as possible and map the results and provide an overview of the type, extent and quantity of research available on a given topic.	Attempts to identify, appraise and synthesize all empirical evidence that meets pre-specified eligibility criteria to answer a given research question. Uses explicit, reproducible methods aimed at minimizing bias, to produce reliable findings and inform decision making.	Synthesises the findings of literature retrieved from searches of computerised databases, hand searches, and authoritative texts
Why choose?	Capture breadth instead of depth of literature; identify gaps within the research area; occasionally used as a precursor to a systematic review.	To address a clearly focused review question by finding the best available, relevant research studies and synthesizing the results.	Often part of a bigger project/thesis. Used to set the scene for the research.
Question	Often broad e.g. trying to find out what is already known about a topic. However, there is also scope to have a pre-conceived question to assess what literature is available around the subject	Focused on a single topic.	May start with a clear question to be answered, but they more often involve general discussion of a subject with no stated hypothesis; i.e., a topical approach.
Sources / Search	Ideally, a protocol or plan is included. Clear objectives are identified. Comprehensive sources and explicit and reproducible search strategy. Use of a wide range of resources, including black and grey literature, of any study type.	A peer review protocol or plan is included. Clear objectives are identified. Comprehensive sources and explicit and reproducible search strategy. Use of a wide range of resources, including black and grey literature. Often a focus on randomised controlled trials.	Does not attempt to locate all relevant literature in a systematic, reproducible way. Search strategy, if presented, may be described in broad terms.

It is worth doing?





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📍 Andries Bickerweg 5, 2517 JP The Hague, the Netherlands

☎ Tel +31703021992 | Fax +31703021999

@ ipsf@ipsf.org

🔍 www.ipsf.org

Email renly.lim@unisa.edu.au
Twitter [@DrRenly](https://twitter.com/DrRenly)

/IPSForg

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Thank **you!**

A large, stylized graphic of the IPSF logo is positioned in the bottom right corner. The letters 'IPSF' are rendered in a bold, outlined font, with the 'I' and 'P' being significantly larger than the 'S' and 'F'. The logo is partially enclosed by a thick, teal-colored curved line that sweeps across the bottom of the page.



Any Questions?



The Young Researchers Forum - Call for Research Working Groups

Research topics:

1. The impact of climate change on Drugs
2. The extent of substandard and falsified medicines and strategies.
3. Other research topics depending on your interest, currency and global relevance

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