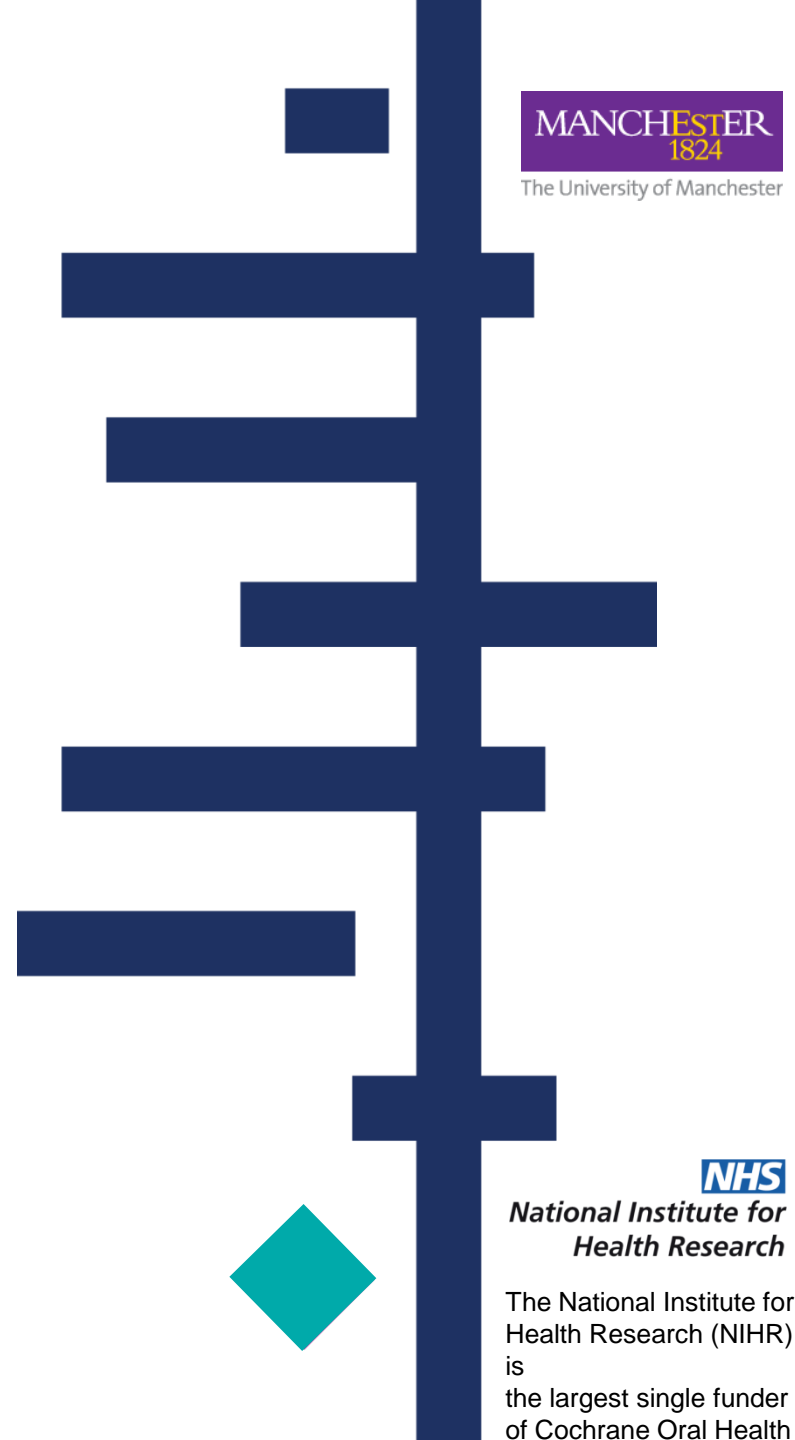


Systematic Reviews

Prof. Anne-Marie Glenny
a.glenny@manchester.ac.uk

Trusted evidence.
Informed decisions.
Better health.



What are systematic reviews?

- A review that has a clearly formulated question, uses explicit methods to derive an answer to that question, based on relevant research evidence
- Systematically locating, appraising and synthesising evidence from scientific studies in order to obtain a reliable overview
- Aim to find all studies addressing the review's question using an objective and transparent process

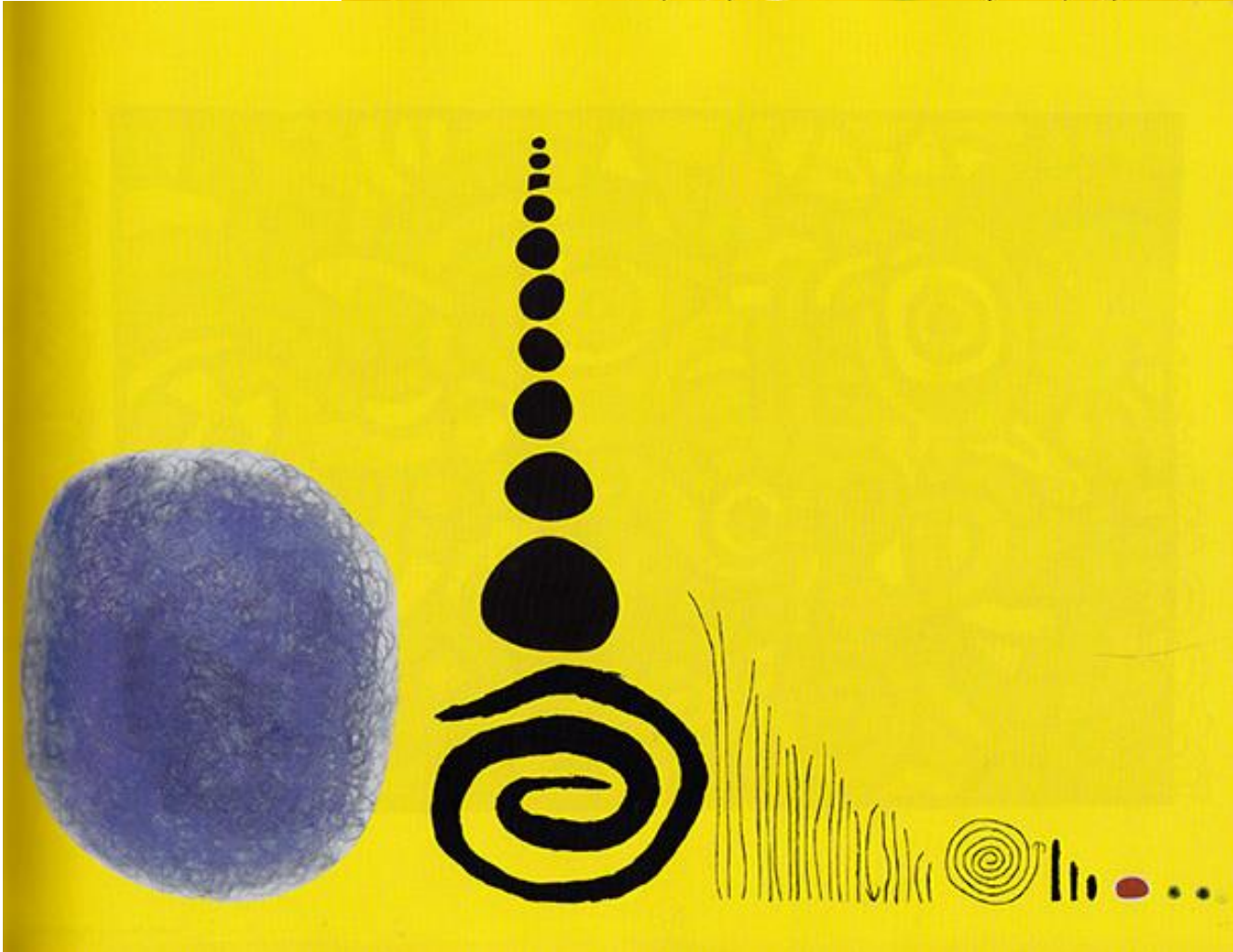
**Systematic
reviews**

The diagram consists of a large light blue oval containing two overlapping circles. The left circle is dark blue and labeled 'Systematic reviews'. The right circle is light blue and labeled 'Meta-analyses'. To the right of these circles, the word 'REVIEWS' is written in dark blue, with 'Narrative/traditional' written below it. The overlapping area between the two circles is a darker shade of blue.

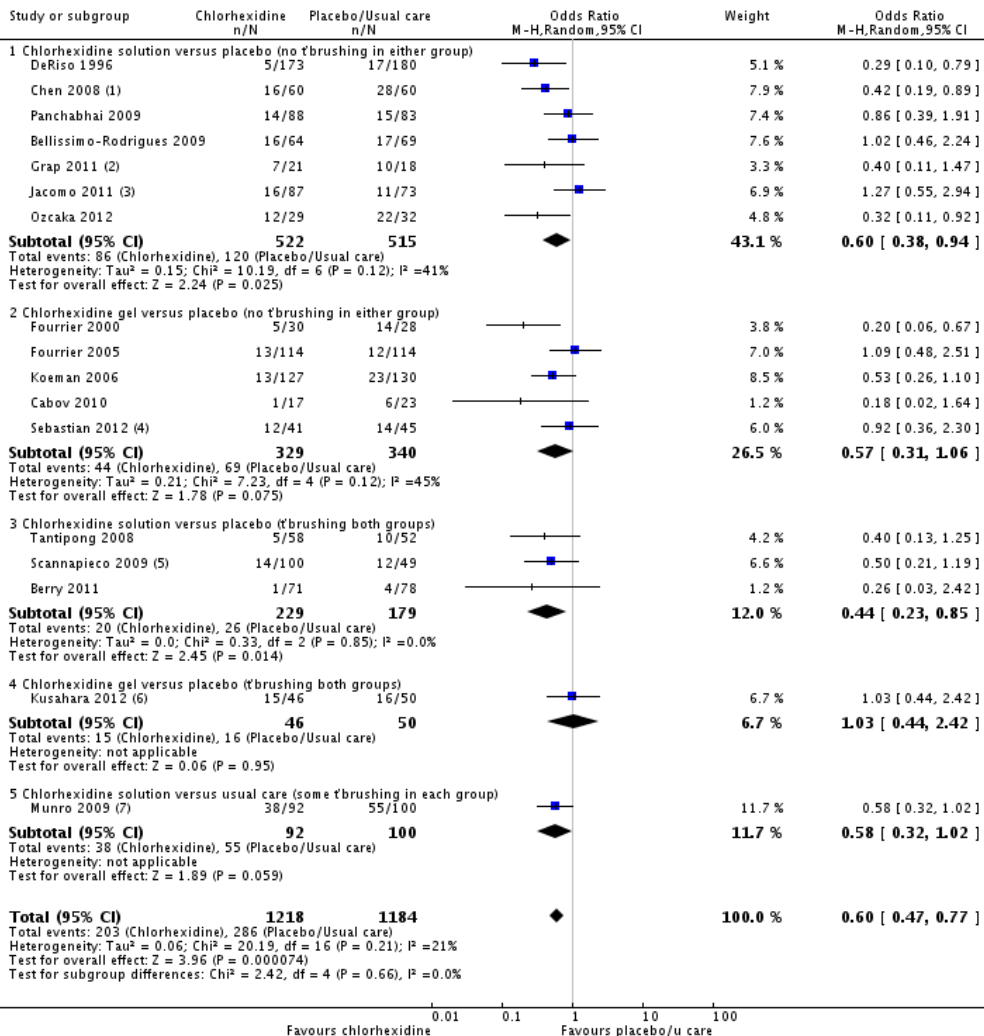
REVIEWS

Narrative/traditional

**Meta-
analyses**



Review: Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia
 Comparison: 1 Chlorhexidine versus placebo/usual care
 Outcome: 1 Incidence of VAP

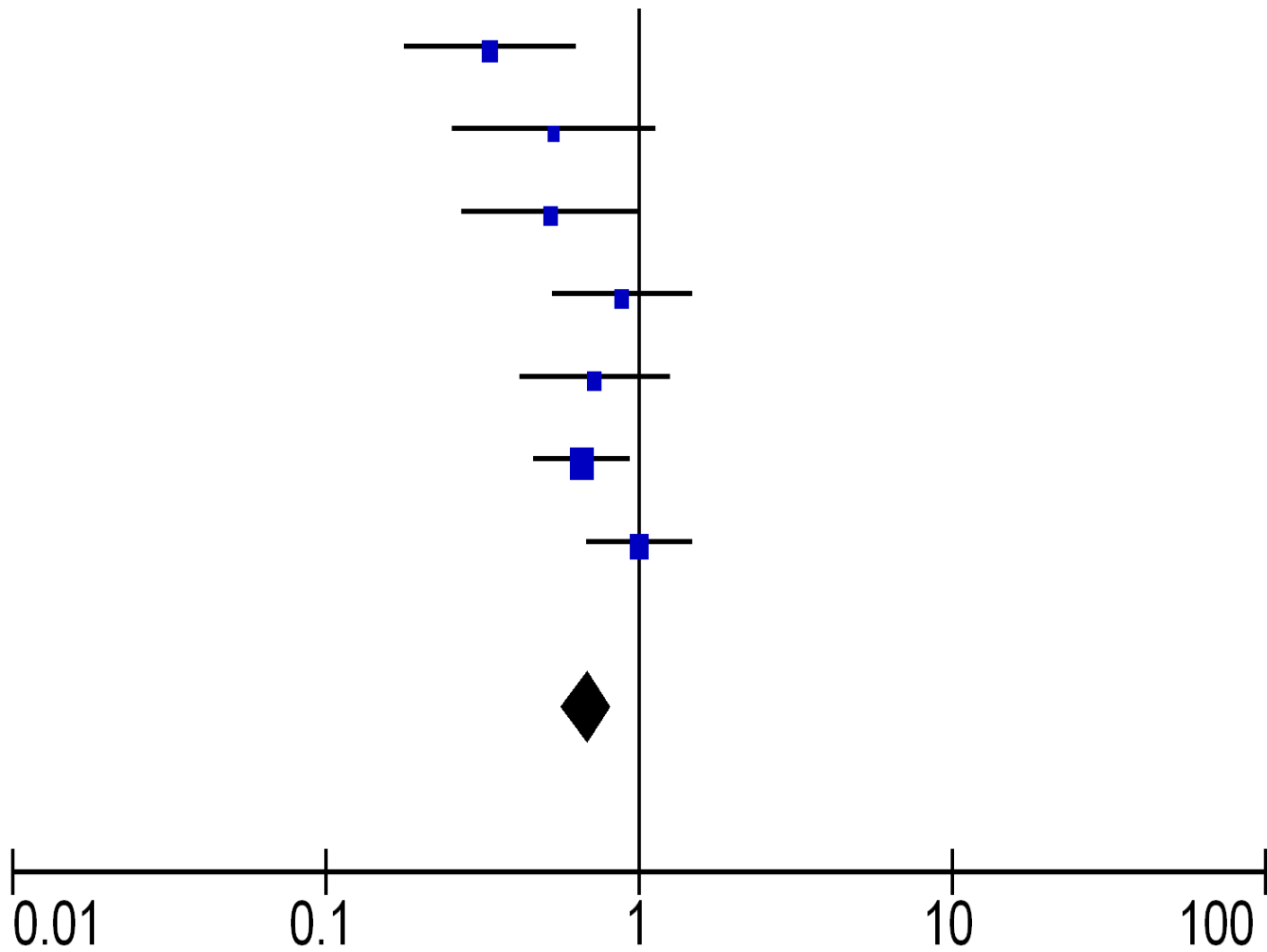


Handwritten notes in purple ink: "99% Placebo" and "99% Chlorhexidine".

HEART & LUNG
 Early, sine
 venis...
 Scherme ScienceDirect
 ORIGINAL ARTICLE
 A comparison of chlorhexidine and sodium bicarbonate oral cleansing solutions on dental plaque colonisation and incidence of ventilator associated pneumonia in mechanically ventilated patients: A randomised control trial
 A.M. Berry
 KEYWORDS
 Chlorhexidine
 Sodium bicarbonate
 Dental plaque
 Ventilator associated pneumonia
 Mechanical ventilation
 Critical care
 Intensive care unit

Why are systematic reviews important?

- Ensure that healthcare decisions are informed by high quality and timely research evidence
- Formulate policy and develop guidelines
- Reduce large quantities of information into manageable portions
- Efficient use of resources
- Increased power/precision
- Limit bias and improve accuracy





Steps of a systematic review

- 1** Define the question (PICO)
- 2 Plan eligibility criteria
- 3 Plan methods
- 4 Search for studies
- 5 Apply eligibility criteria
- 6 Collect data
- 7 Assess studies for risk of bias
- 8 Analyse and present results
- 9 Interpret results and draw conclusions
- 10** Improve and update review

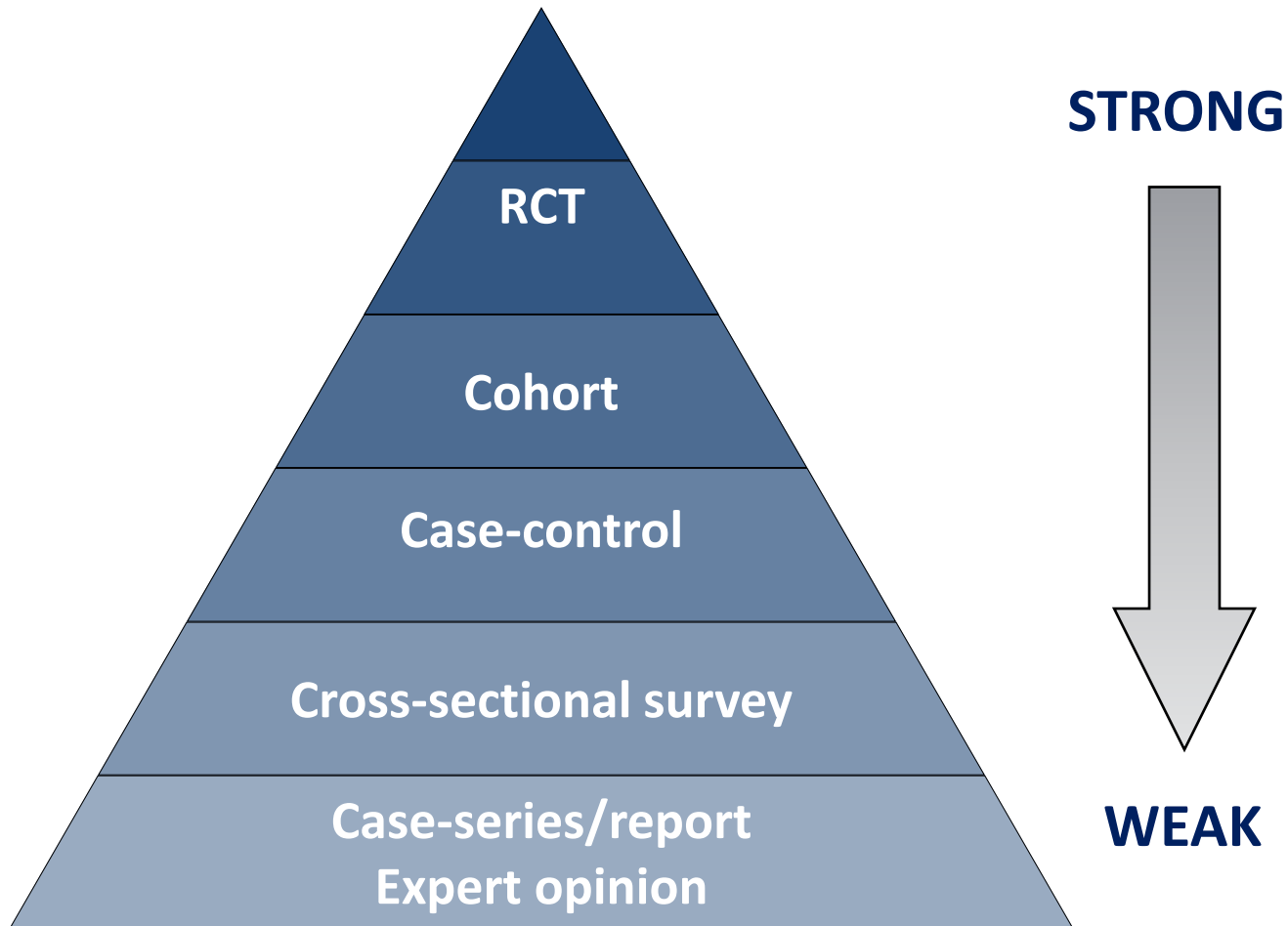
This question is...

- The lynchpin of a systematic review protocol
- Leads on to inclusion and exclusion criteria
- Helps build up a search strategy
- Gets authors thinking about what data to extract, and what quality criteria are important
- Allows authors to decide on their analysis now

Steps of a systematic review

- 1 Define the question (PICO)**
- 2 Plan eligibility criteria
- 3 Plan methods
- 4 Search for studies
- 5 Apply eligibility criteria
- 6 Collect data
- 7 Assess studies for risk of bias
- 8 Analyse and present results
- 9 Interpret results and draw conclusions
- 10 Improve and update review

Hierarchy of evidence



Possible scenarios

- **Question not related to effectiveness of an intervention**
 - Adopting clinical genomics: a systematic review of genomic literacy among physicians in cancer care . (Dung Ha et al 2018)
- **RCTs not feasible in area of study**
 - Penicillins for the prophylaxis of bacterial endocarditis in dentistry. (*Oliver 2004*)
- **Supplement a review of RCTs**
 - Comparative efficacy and safety of long-acting oral opioids for chronic non-cancer pain: a systematic review. (*Chou 2003*)
- **No/limited RCTs**
 - Effectiveness of physiotherapy, occupational therapy, and speech pathology for people with Huntington's disease. (*Bilney 2003*)

Steps of a systematic review

- 1 Define the question (PICO)**
- 2 Plan eligibility criteria
- 3 Plan methods
- 4 Search for studies
- 5 Apply eligibility criteria
- 6 Collect data
- 7 Assess studies for risk of bias
- 8 Analyse and present results
- 9 Interpret results and draw conclusions
- 10 Improve and update review

Steps of a systematic review

- 1 Define the question (PICO)**
- 2 Plan eligibility criteria
- 3 Plan methods
- 4 Search for studies
- 5 Apply eligibility criteria
- 6 Collect data
- 7 Assess studies for risk of bias
- 8 Analyse and present results
- 9 Interpret results and draw conclusions
- 10 Improve and update review

Search strategy

- Needs to be as comprehensive as possible
- **Consider:**
 - Electronic databases (Cochrane Controlled Trials Register, Medline, Embase);
 - Reference lists;
 - Handsearching;
 - English language/non-English language;
 - Sources of ongoing and/or unpublished studies

Reporting biases

- **Statistically significant ‘positive’ results are:**
 - more likely to be published
 - **publication bias**
 - more likely to be published rapidly
 - **time lag bias**
 - more likely to be published in English
 - **language bias**
 - more likely to be cited by others
 - **citation bias**

Publication bias

- Empirical evidence that positive results more likely to be published than negative results

(Scherer 2007, Decullier 2005, Decullier 2007)

- ***OR = 3.90, 95% CI 2.68 to 5.68***

(Hopewell 2008)

Publication bias | an example

- Systematic review of reboxetine, a third-generation antidepressant
- 13 trials, published and unpublished data
- 74% of patient data previously unpublished
- Reboxetine is “*overall an ineffective and potentially harmful antidepressant*”
- Contradicts findings of previous reviews which considered only published data

Steps of a systematic review

- 1 Define the question (PICO)**
- 2 Plan eligibility criteria
- 3 Plan methods
- 4 Search for studies
- 5 Apply eligibility criteria
- 6 Collect data
- 7 Assess studies for risk of bias
- 8 Analyse and present results
- 9 Interpret results and draw conclusions
- 10 Improve and update review

Steps of a systematic review

- 1 Define the question (PICO)**
- 2 Plan eligibility criteria
- 3 Plan methods
- 4 Search for studies
- 5 Apply eligibility criteria
- 6 Collect data
- 7 Assess studies for risk of bias
- 8 Analyse and present results
- 9 Interpret results and draw conclusions
- 10 Improve and update review

Unbiased selection & data extraction process

- Selection of relevant papers
- Data extraction to a predefined data extraction form
- Process should be conducted independently by at least two reviewers

Steps of a systematic review

- 1 Define the question (PICO)**
- 2 Plan eligibility criteria
- 3 Plan methods
- 4 Search for studies
- 5 Apply eligibility criteria
- 6 Collect data
- 7 Assess studies for risk of bias
- 8 Analyse and present results
- 9 Interpret results and draw conclusions
- 10 Improve and update review

Risk of bias assessment

- Process should be conducted independently by at least two reviewers
- Results of the assessment should be reflected in the analysis
- Can be used:
 - As a threshold for inclusion of studies;
 - As a possible explanation for differences in results between trials;
 - In sensitivity analyses;
 - As weights in statistical analysis of the results

Steps of a systematic review

- 1 Define the question (PICO)**
- 2 Plan eligibility criteria
- 3 Plan methods
- 4 Search for studies
- 5 Apply eligibility criteria
- 6 Collect data
- 7 Assess studies for risk of bias
- 8 Analyse and present results**
- 9 Interpret results and draw conclusions
- 10 Improve and update review

Study synthesis

- **Appropriate pooling**
 - qualitative (narrative)
 - quantitative (meta-analysis)
- Clear presentation of individual studies included in the review

Steps of a systematic review

- 1 Define the question (PICO)**
- 2 Plan eligibility criteria
- 3 Plan methods
- 4 Search for studies
- 5 Apply eligibility criteria
- 6 Collect data
- 7 Assess studies for risk of bias
- 8 Analyse and present results
- 9 Interpret results and draw conclusions**
- 10 Improve and update review**

Steps of a systematic review

- 1 Define the question (PICO)**
- 2 Plan eligibility criteria
- 3 Plan methods
- 4 Search for studies
- 5 Apply eligibility criteria
- 6 Collect data
- 7 Assess studies for risk of bias
- 8 Analyse and present results
- 9 Interpret results and draw conclusions
- 10 Improve and update review**

