

Evidence-Based Medicine Journal Club: Systematic Reviews

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Evidence-Based Medicine Journal Club Series

- How to Use an Article About....
- Treatment
- Diagnosis
- Association (Harm or Etiology)
- Prognosis
- How to Use a Systematic Review

Systematic Reviews

- Definitions
- PICO and Study Design
- Validity Questions
- Overall Results
- Applicability
- Example—Cochrane review: Diuretics acting on the distal renal tubule for preterm infants with chronic lung disease

Systematic Reviews

- **Definitions:**
- **Systematic Review:** systematic method for identifying research, assessing for inclusion, determining measures of effect, and *summarizing effects quantitatively* (if approp.)
- **Meta-analysis:** a quantitative approach for systematically assessing the results of previous research to arrive at conclusions about the body of research

Systematic Reviews

- A **systematic review** is a comprehensive overview of a clear, specific, focused clinical question
 - Unlike a "regular" review, has a Methods section
 - Ex. Cochrane Collaboration
- A **meta-analysis** is a systematic review that combines results of multiple studies to answer a clinical question
 - can yield a stronger answer than one study's answer

Systematic Reviews--PICO

- Start with an Answerable Clinical Question (ACQ)
 - **P** The patient's Problem
 - **I** The potential Intervention
 - **C** Comparison to another potential intervention
 - **O** The Outcome of interest

Systematic Reviews

- P In preterm infants with chronic lung disease
- I Do distal diuretics
- C Compared to placebo/controls
- O Improve...need for ventilation; duration of need for oxygen supplementation; development of BPD; mortality...

Systematic Reviews

- Study Design:
- Most appropriate:
 - Randomized Clinical Trials
 - effect measures often similar across studies
 - often more homogeneous in study design (than observational studies)

Systematic Reviews

- Are the results of the study valid?
- What are the results?
- Will the results help me in caring for my patient(s)?

Systematic Reviews

- Are the results of the study valid?
 - **Focused** clinical question? (PICO)
 - Criteria for inclusion of articles appropriate?
 - Unlikely important studies missed?
 - Validity of included studies appraised?
 - Assessments of studies reproducible?

Systematic Reviews

- Criteria used to select studies (Inclusion Criteria): Methods
 - Specify patients, exposures, and outcomes of interest
- Important studies missed?
 - Include unpublished studies?
 - **Publication bias**: higher likelihood for studies with positive results to be published and risk to overestimate efficacy or adverse effects

Systematic Reviews

- Validity of individual included studies:
 - Therapy examples: (Results likely to be Valid?)
 - Was the assignment of patients to treatments randomized?
 - Were patients and clinicians kept blind to treatment?
 - Were all the patients who entered the trial properly accounted for and attributed?
- Assessments of studies reproducible?
 - Two (or more) reviewers

Systematic Reviews

- What are the results?
 - Results similar from study to study?
 - Overall results of the review?
 - How precise were the results?

Systematic Reviews

- Similarities (and differences) between studies documented
- Can you combine the study results?
- **Tests of heterogeneity:** measures how far each study result is from the overall mean
 - Statistically significant heterogeneity = low probability that the differences in results from study to study is due to chance along

Systematic Reviews

- Overall results:
 - Meta-analyses weight studies according to their size (and +/- quality)
 - Quantitative summary if possible:
 - Ex., for treatment, Relative Risk or Risk Reduction, with 95% CI
 - Graphs: standard meta-analysis plot shows each study (point estimate, with CI) and pooled estimate (with CI)

Systematic Reviews

- Will the results help me in caring for my patients?
 - Can results be applied to my patient(s)?
 - All clinically important outcomes considered?
 - Are benefits worth harms and costs?

Systematic Reviews: Summary

- Meta-analysis—quantitatively tries to answer a focused clinical question (PICO)
- Are the results likely to be valid?
 - Inclusion criteria (publication bias?)
- What are the results?
 - Studies similar (heterogeneity); - CI's
- Will the results help me in caring for my patient?

Systematic Reviews: References

- Users' Guide to Medical Literature: VI. How to Use an Overview (JAMA)
- University of Illinois at Chicago EBM Workshop
- Introduction to Epidemiology Course at UM—Dr. Langenberg's Systematic Reviews Lecture