

SYSTEMATIC REVIEW UNIT

Goal:

At the completion of this module, participants will be able to critically appraise a systematic review and gain an understanding of the role of systematic reviews in guiding practice.

Instructional Objectives:

At the completion of this unit you will be able to:

1. Assess the validity of a Systematic Review.
2. Understand the concept of heterogeneity, and how this is measured.
3. Interpret a meta-analysis plot.
4. Appreciate the role of a sensitivity analysis.
5. Be aware of the issues with subgroup analyses.

Reference (Further Reading):

JAMA Evidence Webpage

Click on the 'book' *Users' Guides to the Medical Literature*

- Click - Summarizing the Evidence
- Chapter 22 The Process of Systematic Review and Meta-Analysis
- Chapter 23 Understanding and Applying the Results of a Systematic Review

Problem-Based Educational Strategy:

1. Read the Users Guides introductory chapter on Summarizing the Evidence on the JAMA Evidence Webpage.
2. Advanced learners could review the chapters on subgroup analyses and heterogeneity.
3. Read the scenario below.
4. Compose a well-built PICO-format clinical question about the problem posed
5. Conduct a thorough literature review using the information from your PICO question and narrow your results to systematic reviews/meta-analyses
6. Read the reference: Thompson J, Biggs BA and Pasricha SR. Effects of daily iron supplementation in 2- to 5-year-old children: Systematic review and meta-analysis. *Pediatrics*. 2013; 131:739-753.
7. Complete the critical appraisal form.
8. Return to the scenario and formulate a recommendation.

Clinical Scenario:

You are seeing Andrew, a 3-year-old child who is with his adopted mother for a routine well-child evaluation. Andrew was recently adopted from Africa where he was living in an orphanage. His physical exam is only notable for pale conjunctiva. He is otherwise well-nourished and with no physical exam findings suggestive of infection or other pathophysiology.

Upon review of his laboratory values, you find that he is anemic (Hgb = 8.6g/dL [86g/L]) with evidence of iron-deficiency (i.e., elevated red cell distribution width [RDW], low mean corpuscular volume [MCV], and low serum iron level). You prepare to call his family and inform them of the laboratory results. As you pick up the phone, you realize that you have not recently searched the literature to determine the latest evidence regarding iron supplementation in young children with iron-deficiency anemia.

You frame your PICO question and put the relevant search terms into PUBMED, Clinical Queries. You find a systematic review in a recent article in Pediatrics: “Effects of daily iron supplementation in 2- to 5- year-old children: systematic review and meta-analysis” by Thompson et al. and you decide to critically appraise this review using the skills you have recently acquired at the PIE EBCP Workshop.

CRITICAL REVIEW FORM: SYSTEMATIC REVIEW

Identify and outline your clinical question in plain language:

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Build a PICO:

P	
I	
C	
O	

Preferred Resource:

Meta-analysis/Systematic Review RCT Cohort Case Control

Databases Searched:

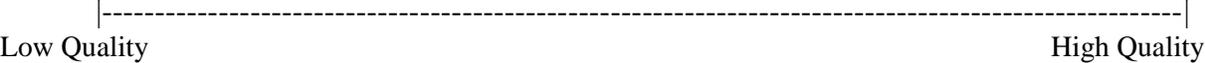
Resource Acquired:

CRITICAL APPRAISAL

Are the results of the study valid?	
Did the review explicitly address a sensible question?	
Was the search for relevant studies detailed and exhaustive?	

Were the primary studies of high methodologic quality?	
Were the assessments of the included studies reproducible?	
What are the results?	
What are the overall results of the study?	
How precise are the results?	
Were the results similar from study to study?	

Strength of Evidence:



How does this apply to your patient?

CRITICAL REVIEW FORM: SYSTEMATIC REVIEW UNIT

Citation: Thompson J, Biggs BA and Pasricha SR. Effects of daily iron supplementation in 2- to 5-year-old children: Systematic review and meta-analysis. *Pediatrics*. 2013; 131:739-753

Guide		Comments
I	Are the results of the study valid?	
	1. Did the review explicitly address a sensible question?	Yes. Provided a review of the data regarding daily iron supplementation for children with or at-risk for developing iron-deficiency anemia.
	2. Was the search for relevant studies detailed and exhaustive?	Yes. Utilized multiple databases as well as thesis repositories, gray literature, and references of studies and prior reviews.
	3. Were the primary studies of high methodologic quality?	No. All studies were considered at high risk of bias. Additionally, adherence was only documented in 2 of the included studies.
	4. Were the assessments of the included studies reproducible?	Yes.
II	What are the results?	
	1. What are the overall results of the study?	Heterogeneity existed in the results, attributed to subgroup differences. However, the overall effect on hemoglobin and ferritin levels was largely similar from study to study.
	2. How precise are the results?	Iron supplementation reliably increased hemoglobin and ferritin levels. Data is limited on other outcomes to make a definitive statement.
	3. Were the results similar from study to study?	As reflected in Figure 3, the results for impact on hemoglobin and ferritin levels are relatively precise (indicated by the narrow diamond representing the pooled data; broader diamonds would indicate less precision, with a larger spread of the data).

III	Will the results help me in caring for my patients?	
1. Were all patient-important outcomes considered?	Yes. The study reviewed hematologic markers (less patient-relevant, but important) as well as cognitive development, growth and infection risk parameters.	
2. Are any postulated subgroup effects credible?	Yes, but limited by small numbers of studies.	
3. Are the benefits worth the costs and potential risks?	Yes. No clear risks were demonstrated and the cost of supplementation is low.	