SYSTEMATIC REVIEWS AND META-ANALYSES

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In-Person Session 1 of 5

COURSE WEBSITE

- Slides and all other resources you'll need for the course are available at:

https://facenteconsulting.com/srmacourse/

CURRICULUM

Monday

- Sensitivity analyses & stratified analyses
- Understanding SRMA limitations
- Interpreting and reporting results

Tuesday

- Review and practice defining the review question and PICOS criteria to be used
- Work time

Wednesday

- Tips and Tricks with Covidence
- Work time

Thursday

- Deeper dive into evaluating bias
- Publishing your review
- Work time

Friday

- Reviewing special types of SRs and MAs
- Final chance for Q&A from the course
- Group presentations

Virtual in October

- Overview of SRs and MAs
- PROSPERO and PRISMA
- Defining the review question
- Searching for records and studies
- Extracting and organizing data
- Summarizing data and meta-analysis
- Evaluating Bias

INTRODUCTIONS

Sit with your group!

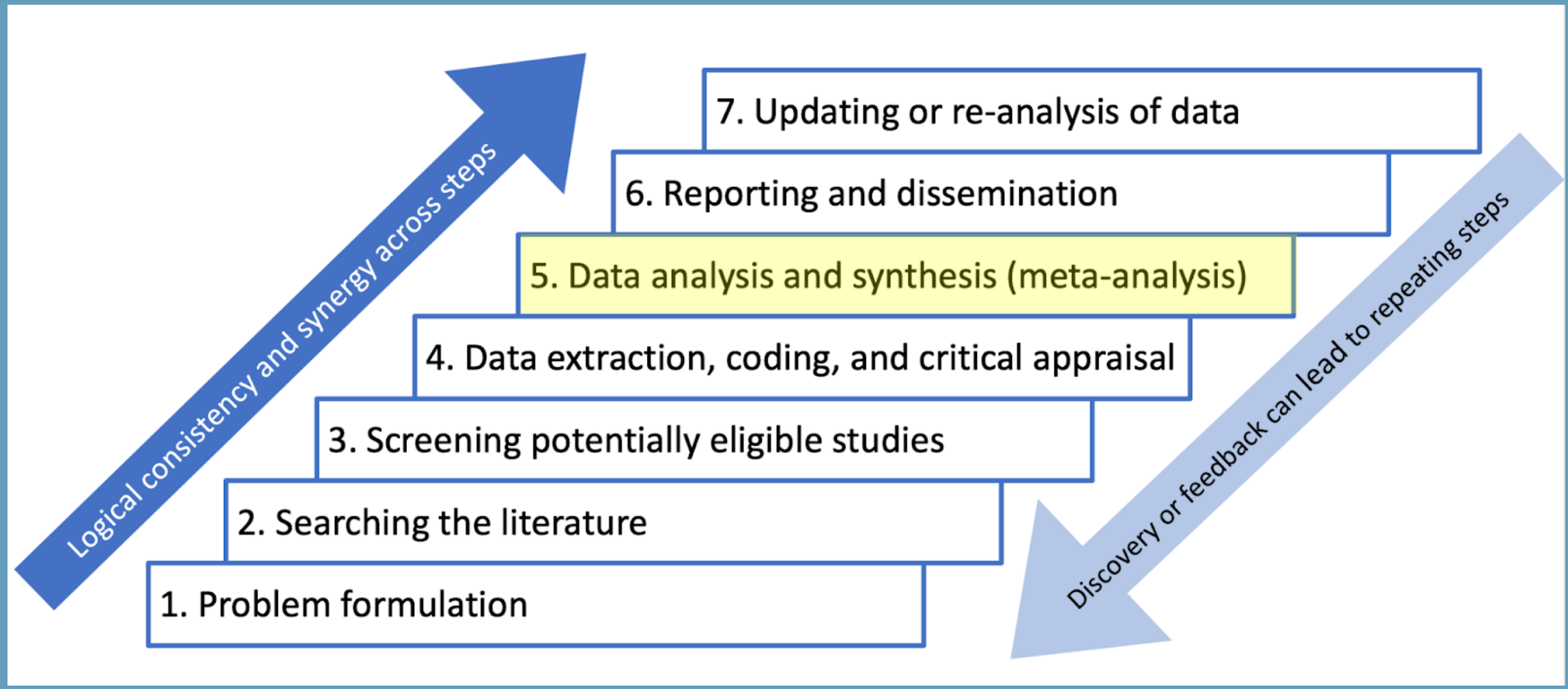
For each of you:

1. Your name
2. Your role/year in your program

For the group:

1. The main topic of your systematic review
2. How far along in the process you are
3. What you're hoping to get help with this week

SYSTEMATIC REVIEWS PROCESS



https://oli.cmu.edu/courses/systematic-reviews-and-meta-analysis-o-f/#

SENSITIVITY ANALYSIS

- Sensitivity analysis – Used to assess whether findings are robust and whether decisions made in the systematic review and meta-analysis impacted results.

"When sensitivity analyses show that the overall result and conclusions are not affected by the different decisions that could be made during the review process, the results of the review can be regarded with a higher degree of certainty. Where sensitivity analyses identify particular decisions or missing information that greatly influence the findings of the review, greater resources can be deployed to try and resolve uncertainties and obtain extra information, possibly through contacting trial authors and obtaining individual participant data. If this cannot be achieved, the results must be interpreted with an appropriate degree of caution. Such findings may generate proposals for further investigations and future research."

https://training.cochrane.org/handbook/current/chapter-10#section-10-14

SENSITIVITY AND STRATIFIED (SUBGROUP) ANALYSIS

- Subgroup analysis to explore heterogeneity
- Sometimes sensitivity analysis and subgroup analysis are confused for each other, but they are different things!

Sensitivity Analysis	Subgroup Analysis
Look at the data differently to see how it changes the findings - for example, restrict the analysis group to a subset of the larger study sample and then see if the results change	Stratify the larger study sample into multiple subgroups (e.g. by gender, or by geography) and then test whether the group are statistically different with respect to the outcome or effect measure
Make informal (descriptive) comparisons between different ways of estimating the same thing, to see if the method chosen influences the results	Use formal statistical testing to make comparisons across subgroups and present quantitative findings of those comparisons

https://training.cochrane.org/handbook/current/chapter-10#section-10-14

SENSITIVITY ANALYSIS EXAMPLES

Searching for studies:

- Should abstracts whose results cannot be confirmed in subsequent publications be included in the review?

Eligibility criteria:

- Characteristics of participants: where a majority but not all people in a study meet an age range, should the study be included?
- Characteristics of the intervention: what range of doses should be included in the meta-analysis?
- Characteristics of the comparator: what criteria are required to define usual care to be used as a comparator group?
- Characteristics of the outcome: what time-point or range of time-points are eligible for inclusion?
- Study design: should blinded and unblinded outcome assessment be included, or should study inclusion be restricted by other aspects of methodological criteria?

Taken directly from https://handbook-5-1.cochrane.org/chapter_9/9_7_sensitivity_analyses.htm

SENSITIVITY ANALYSIS EXAMPLES

What data should be analysed?

- **Time-to-event data:** What assumptions of the distribution of censored data should be made?
- **Continuous data:** Where standard deviations are missing, when and how should they be imputed? Should analyses be based on change scores or on final values?
- **Ordinal scales:** What cut-point should be used to dichotomize short ordinal scales into two groups?
- **Cluster-randomized trials:** What values of the intraclass correlation coefficient should be used when trial analyses have not been adjusted for clustering?
- **Cross-over trials:** What values of the within-subject correlation coefficient should be used when this is not available in primary reports?
- **All analyses:** What assumptions should be made about missing outcomes to facilitate intention-to-treat analyses? Should adjusted or unadjusted estimates of treatment effects used?

Taken directly from https://handbook-5-1.cochrane.org/chapter_9/9_7_sensitivity_analyses.htm

SENSITIVITY ANALYSIS EXAMPLES

Analysis methods:

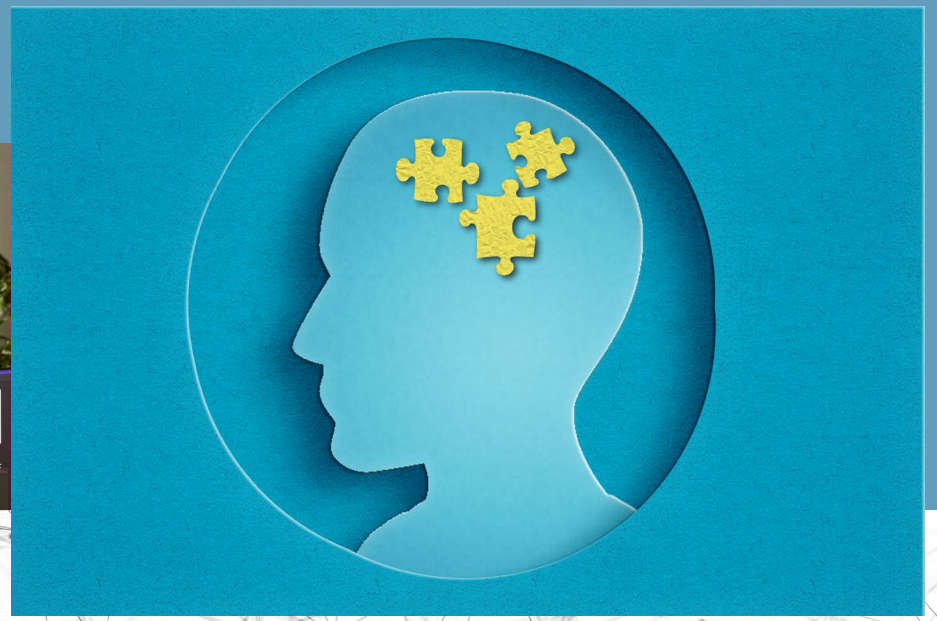
•Should fixed-effect or random-effects methods be used for the analysis?

•For dichotomous outcomes, should odds ratios, risk ratios or risk differences be used?

•And for continuous outcomes, where several scales have assessed the same dimension, should results be analysed as a standardized mean difference across all scales or as mean differences individually for each scale?

Taken directly from https://handbook-5-1.cochrane.org/chapter_9/9_7_sensitivity_analyses.htm

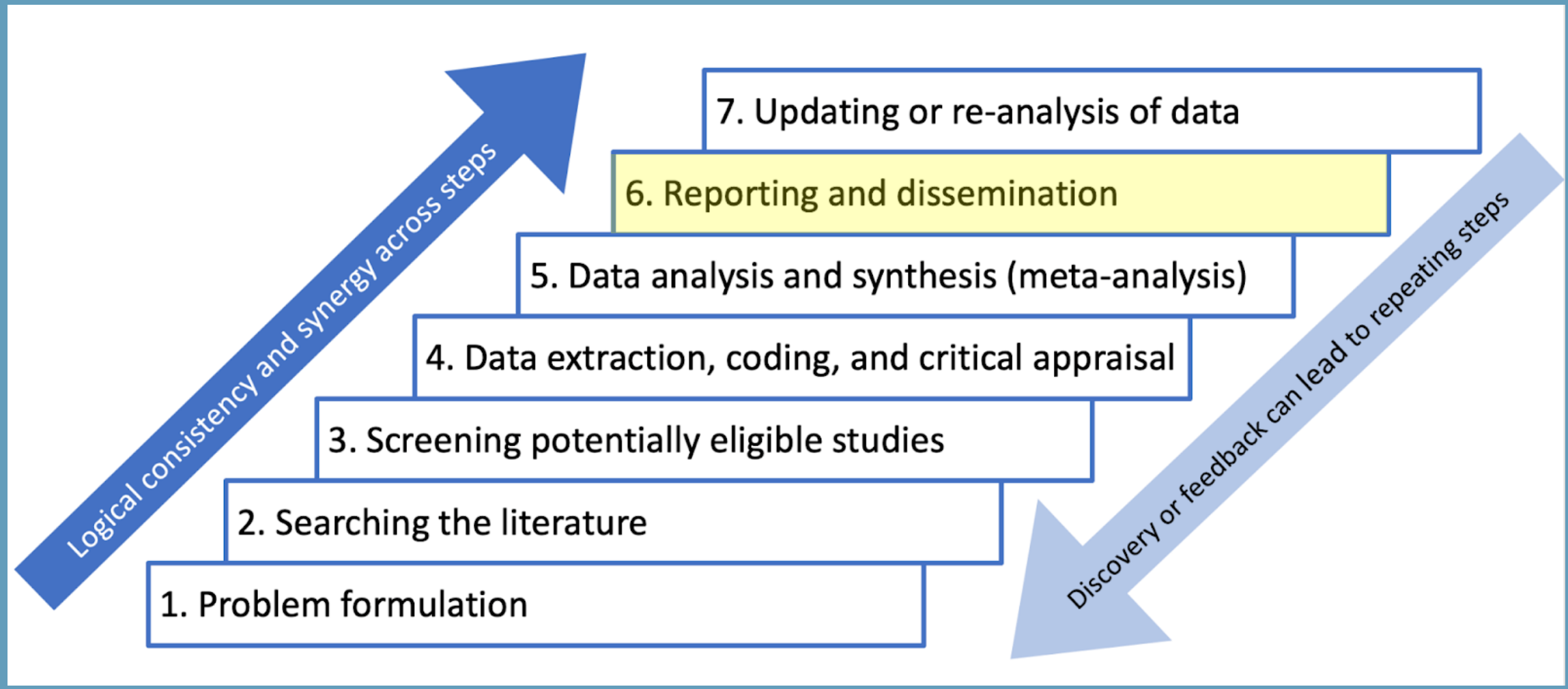
UNDERSTANDING SRMA LIMITATIONS



COMMON LIMITATIONS IN SRMA

- Few eligible studies
- Heterogeneity in outcomes
- Differences in methods/quality of methods in included studies

SYSTEMATIC REVIEWS PROCESS



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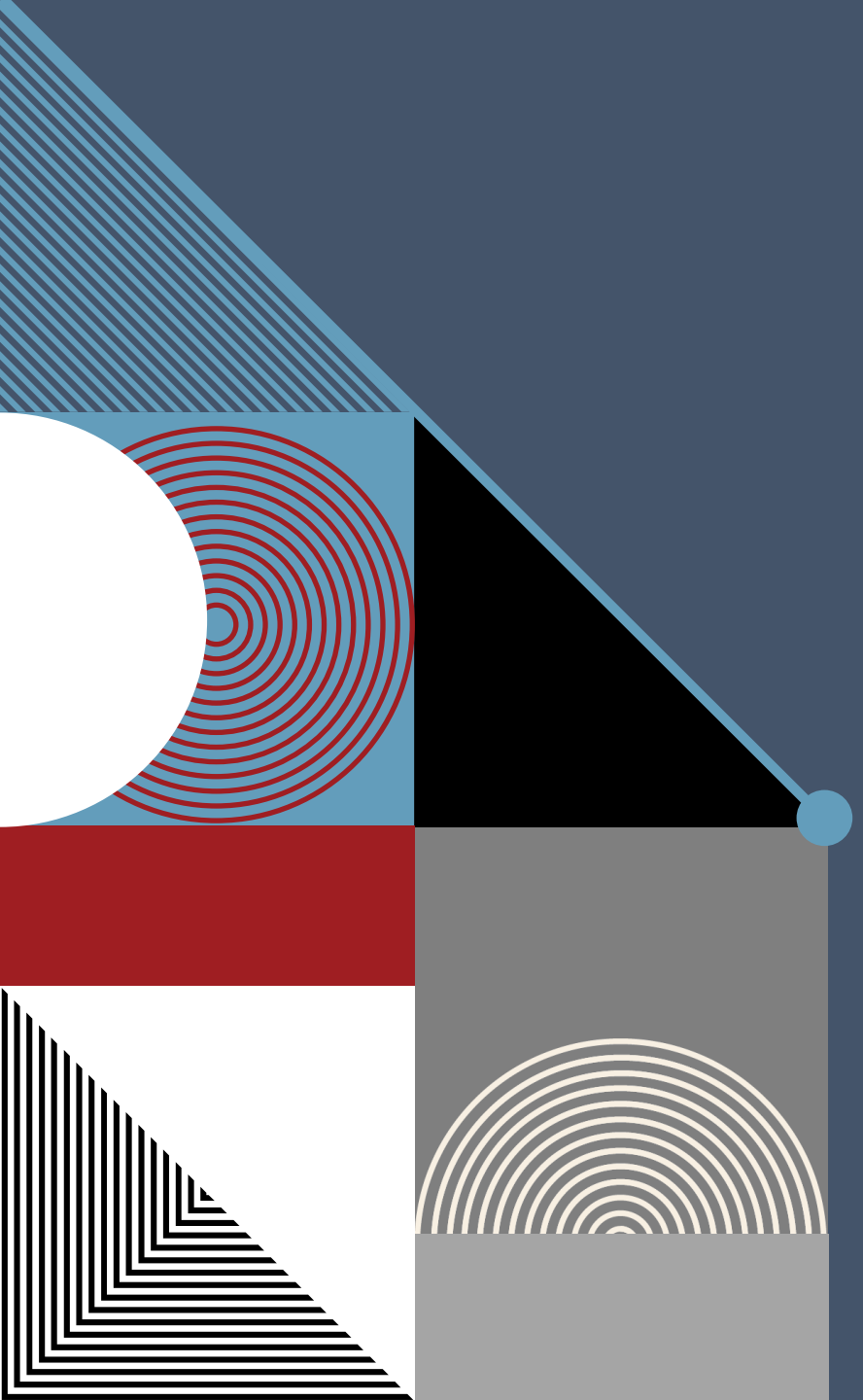

SUMMARIZING DATA AND META-ANALYSIS

INTERPRETING AND REPORTING RESULTS

Need for caution and care in interpreting results

INTERPRETING AND REPORTING RESULTS

Discussion section

Looking at limitations of studies

Indications of heterogeneity or bias

Generalizability of findings

AVOIDING PLAGIARISM

Merriam-Webster defines plagiarism as **"the act of using another person's words or ideas without giving credit to that person."**

- Purposefully using another's words without citing and using quotation marks
- Using the wrong source to cite
- Submitting another's thoughts as your own
- A host of other situations in which it isn't clear whose ideas are whose

Some tips:

- Make a habit of citing as you go
- If you cut and paste ideas when in rough draft form, mark them clearly, especially when working with a team

INTERPRETING AND REPORTING RESULTS

Case Studies

BMJ. 2014 May 21;348:g3253. doi: 10.1136/bmj.g3253

Use of placebo controls in the evaluation of surgery: systematic review

Karolina Wartolowska [1,2,✉], Andrew Judge [1,2,3], Sally Hopewell [2,4], Gary S Collins [2,4], Benjamin J F Dean [1,2], Ines Rombach [1,2], David Brindley [1,2,5,6], Julian Savulescu [7], David J Beard [1,2,8], Andrew J Carr [1,2,8]

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PMCID: PMC4029190 PMID: 24850821

J Int AIDS Soc. 2023 Jul 13;26(Suppl 2):e26107. doi: 10.1002/jia2.26107

Systematic review of the values and preferences regarding the use of injectable pre-exposure prophylaxis to prevent HIV acquisition

Lara Lorenzetti [1,✉], Nhi Dinh [1], Ariane van der Straten [2,3], Virginia Fonner [1], Kathleen Ridgeway [1], Michelle Rodolph [4], Robin Schaefer [4], Heather-Marie A Schmidt [4,5], Rachel Baggaley [4]

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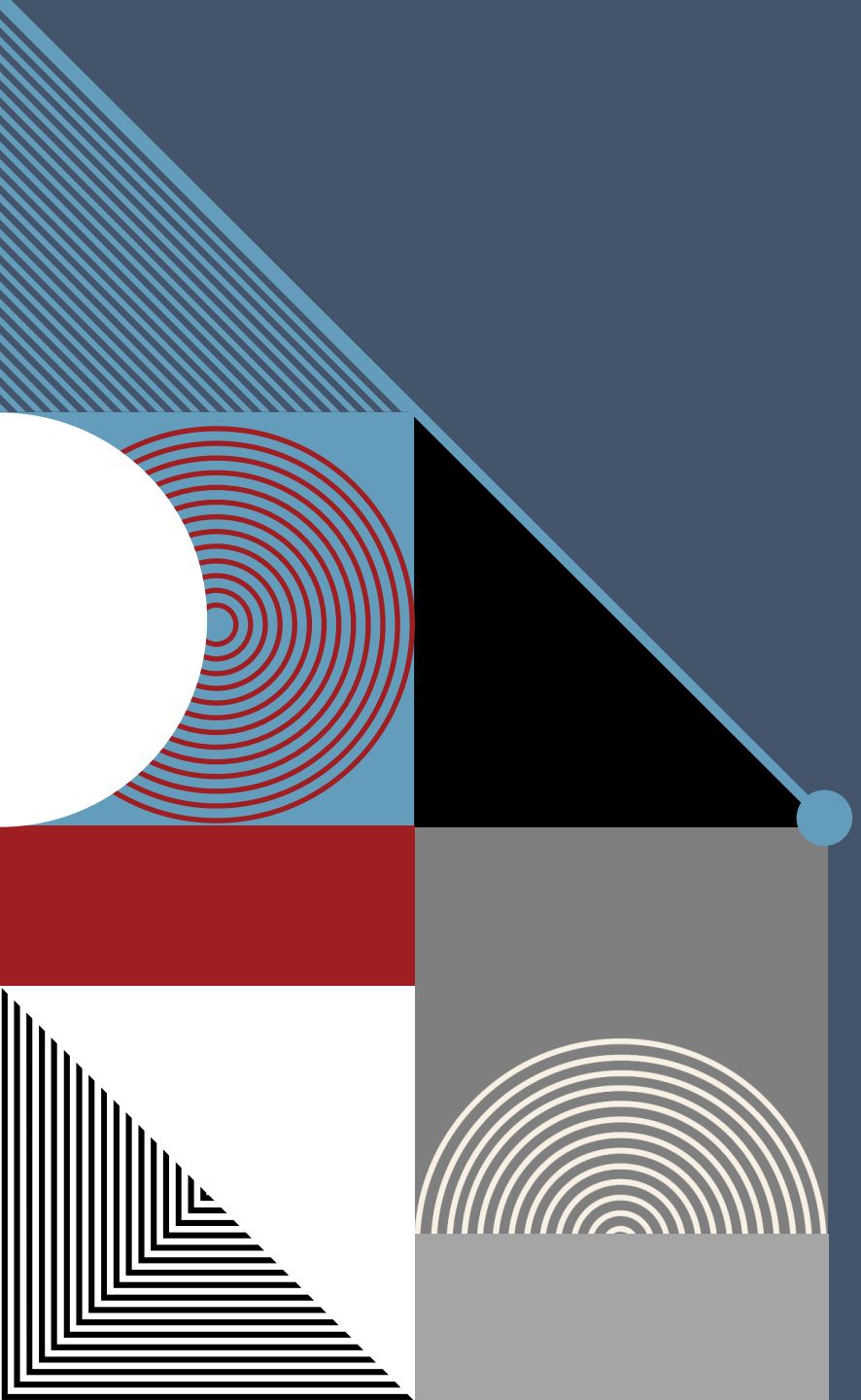
PMCID: PMC10805120 PMID: 37439057

INTERPRETING AND REPORTING RESULTS

1. What are three things you think the authors of this systematic review did especially well?
2. What are at least two instances where the authors did not follow best practices we've discussed so far this week?
3. What questions do you still have about what they did (or why)?
4. What is at least one thing you think you'd want to remember so you can replicate the method or reporting for your own SRMA?

LUNCH!



PRACTICE

Continued searching and screening studies in your groups!