

MASTERING THE SYSTEMATIC REVIEW DAY - 2

FROM RESEARCH QUESTION TO RESEARCH EVIDENCE!!

TODAY'S FOCUS:

- **HOW TO SEARCH FOR RELEVANT RESEARCH ARTICLES.**
- **HOW TO MANAGE AND CITE THEM CORRECTLY.**

WHAT IS SEARCH STRATEGY?

COOKING PASTA CARBONARA FOR THE FIRST TIME

STEPS YOU WILL FOLLOW!!!



STEP 1

DEFINE THE GOAL
CLEARLY

STEP 5

PICK THE BEST
RESULT

STEP 2

LIST KEY
INGREDIENTS OR
NEEDS

STEP 3

USE FILTERS

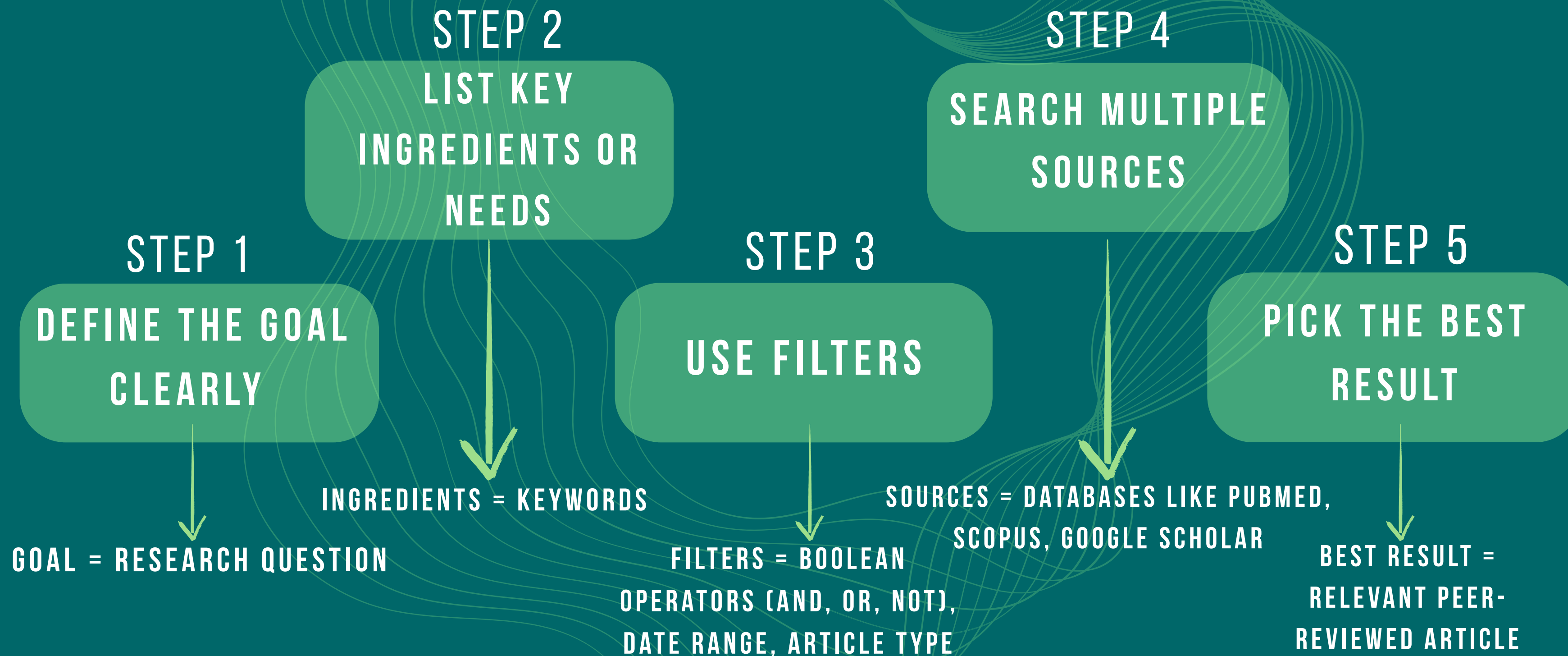
STEP 4

SEARCH MULTIPLE
SOURCES

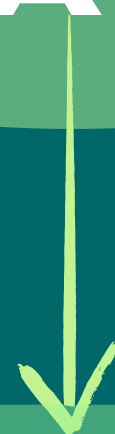
IN RESEARCH WE DO THE SAME



IN RESEARCH WE DO THE SAME



**IN SUMMARY→
WHAT IS A SEARCH
STRATEGY (IN
RESEARCH)?**



**A SEARCH STRATEGY IS JUST A SMART, STEP-
BY-STEP PLAN TO FIND THE RIGHT
INFORMATION FROM THE RIGHT PLACES, USING
THE RIGHT WORDS.**

WHAT IF WE DON'T USE SEARCH STRATEGY?

✗
MISSED RELEVANT
STUDIES

✗
SELECTION BIAS

✗
LACK OF
TRANSPARENCY

✗
DIFFICULTY DURING
PEER REVIEW

✗
FAILURE TO MEET
PRISMA STANDARDS

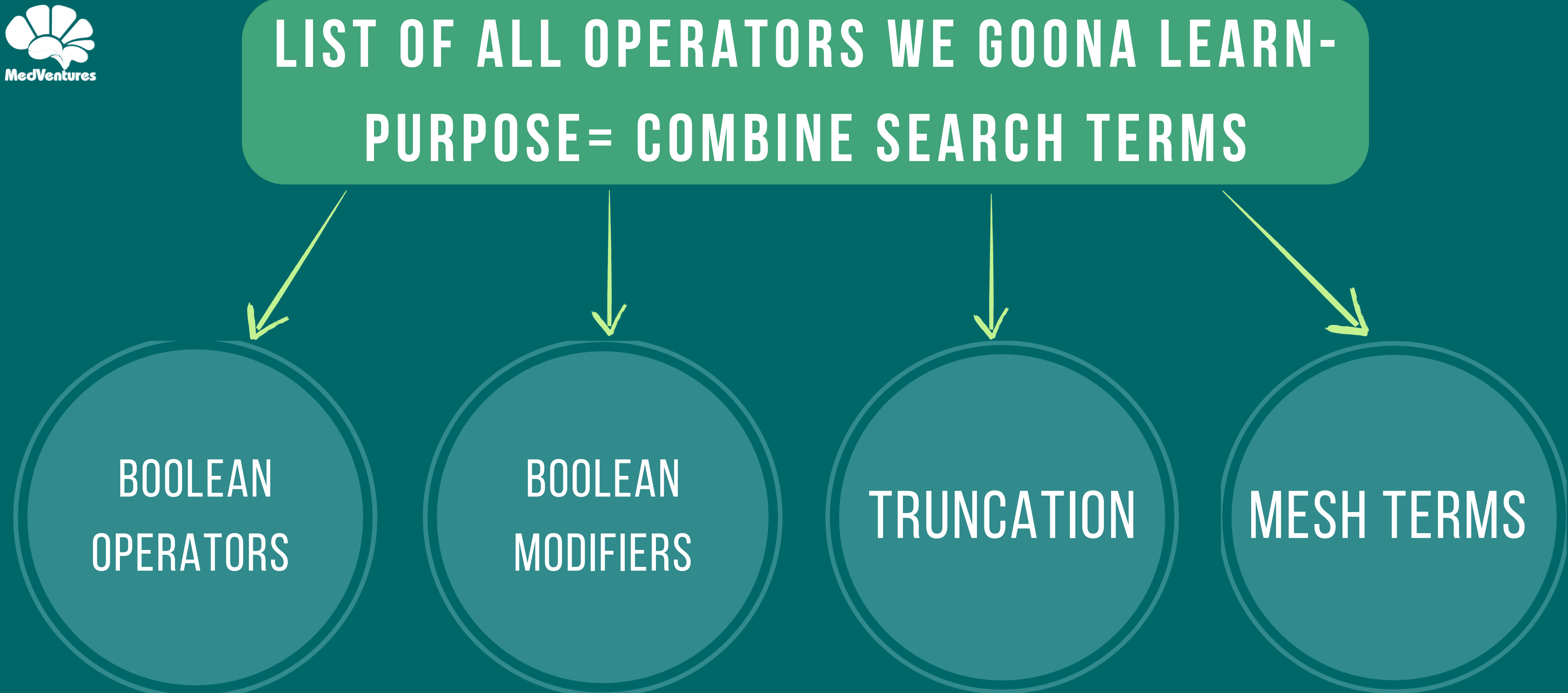
**IN SUMMARY→
IF NO SEARCH
STRATEGY**



**“ YOUR SYSTEMATIC REVIEW IS NO LONGER
SYSTEMATIC. IT BECOMES A NARRATIVE REVIEW
AT BEST—AND A BIASED, INCOMPLETE ONE AT
WORST” .**

LIST OF ALL OPERATORS WE GOONA LEARN-

PURPOSE= COMBINE SEARCH TERMS



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graph TD; A[LIST OF ALL OPERATORS WE GOONA LEARN-  
PURPOSE= COMBINE SEARCH TERMS] --> B[BOOLEAN OPERATORS]; A --> C[BOOLEAN MODIFIERS]; A --> D[TRUNCATION]; A --> E[MESH TERMS];
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BOOLEAN
OPERATORS

BOOLEAN
MODIFIERS

TRUNCATION

MESH TERMS

BOOLEAN OPERATORS

THESE ARE WORDS YOU USE TO COMBINE SEARCH
TERMS WHEN LOOKING FOR ARTICLES:

1) **AND**- NARROWS THE SEARCH. IT FINDS ARTICLES THAT INCLUDE BOTH TERMS.

Example: smoking AND cholesterol → finds articles that mention both smoking and cholesterol.

BOOLEAN OPERATORS

THESE ARE WORDS YOU USE TO COMBINE SEARCH
TERMS WHEN LOOKING FOR ARTICLES:

2) **OR**: BROADENS THE SEARCH. IT FINDS ARTICLES THAT INCLUDE
EITHER TERM.

Example: exercise OR physical activity → finds articles
that mention either one or both.

BOOLEAN OPERATORS

THESE ARE WORDS YOU USE TO COMBINE SEARCH
TERMS WHEN LOOKING FOR ARTICLES:

3) **NOT**: EXCLUDES TERMS. IT REMOVES ARTICLES THAT INCLUDE THE
TERM AFTER NOT.

Example: smoking NOT teenagers → finds articles about
smoking, but not about teenagers

MESH TERMS

MESH STANDS FOR MEDICAL SUBJECT HEADINGS. THESE ARE SPECIAL TERMS USED IN PUBMED TO GROUP ARTICLES BY MEANING.

EXAMPLE: INSTEAD OF SEARCHING FOR “**HEART ATTACK**,” YOU CAN USE THE MESH TERM “MYOCARDIAL INFARCTION”.

IT HELPS YOU FIND ALL ARTICLES ON A TOPIC, EVEN IF DIFFERENT WORDS ARE USED.

TIP: IN **PUBMED**, YOU CAN FIND MESH TERMS BY GOING TO THE MESH DATABASE.

TRUNCATION

THIS IS A WAY TO SEARCH FOR ALL FORMS OF A WORD BY ADDING AN ASTERISK (*) AT THE END.

EXAMPLE:

- SMOK* → FINDS SMOKE, SMOKER, SMOKING, SMOKERS
- DIET* → FINDS DIET, DIETS, DIETING, DIETARY

IT HELPS YOU SAVE TIME AND NOT MISS OUT ON RELATED TERMS.

BOOLEAN MODIFIERS

THESE ARE TOOLS TO MAKE YOUR SEARCH MORE PRECISE:

- **QUOTATION MARKS** (" "): USE THEM TO SEARCH FOR AN EXACT PHRASE.

EXAMPLE: "PHYSICAL ACTIVITY" → FINDS ONLY THAT EXACT PHRASE.

- **PARENTHESES** (): USE THEM TO GROUP TERMS WHEN USING OR AND AND TOGETHER.

EXAMPLE: (SMOKING OR TOBACCO) AND CHOLESTEROL

THIS TELLS THE DATABASE TO FIND ARTICLES THAT MENTION EITHER SMOKING OR TOBACCO ALONG WITH CHOLESTEROL.

COMMON SEARCH PITFALLS

- USING TOO MANY OR TOO FEW KEYWORDS
- OVER-RELIANCE ON BROAD TERMS
- IGNORING SYNONYMS OR MESH
- FORGETTING FILTERS (DATE, TYPE, ETC.)

TIP: ALWAYS TEST AND REFINE YOUR SEARCH STRING.

TOOLS & DATABASES TO USE

- **PUBMED** — BIOMEDICAL & LIFE SCIENCES
- **ELICIT.ORG** — AI-ASSISTED EVIDENCE FINDER
- **GOOGLE SCHOLAR** — BROAD ACCESS BUT NOT VERY SPECIFIC
- **COCHRANE LIBRARY** — HIGH-QUALITY REVIEWS

TIP: EACH HAS PROS/CONS: USE AT LEAST 2-3 FOR COMPLETENESS.

REAL WORLD CHALLENGES STUDENTS FACE

- **GETTING TOO MANY IRRELEVANT RESULTS**
- **FINDING TOO FEW PAPERS FOR NICHE TOPICS**
- **CONFUSION OVER MESH VS KEYWORDS**
- **GETTING OVERWHELMED BY ARTICLE VOLUME**

BIAS IN THE ARTICLE SELECTION

WHAT IS BIAS?

BIAS MEANS A **SYSTEMATIC ERROR** THAT MAKES THE RESULTS OF A STUDY OR REVIEW LESS ACCURATE OR UNFAIR.

IT CAN MAKE RESULTS LOOK BETTER OR WORSE THAN THEY TRULY ARE.

HOW AND WHEN CAN BIAS APPEAR?

BIAS CAN HAPPEN:

- BEFORE THE STUDY STARTS (PLANNING STAGE)
- DURING THE STUDY (COLLECTING OR ANALYZING DATA)
- AFTER THE STUDY (WRITING OR PUBLISHING RESULTS)

IT CAN ALSO HAPPEN WHILE SELECTING STUDIES IN A
SYSTEMATIC REVIEW.

COMMON TYPES OF BIAS

1) SELECTION BIAS — HAPPENS WHEN CERTAIN PEOPLE OR STUDIES ARE CHOSEN UNFAIRLY.

EXAMPLE: ONLY CHOOSING STUDIES WITH POSITIVE RESULTS.

2 PUBLICATION BIAS — HAPPENS WHEN ONLY PUBLISHED (POSITIVE OR SUCCESSFUL) STUDIES ARE INCLUDED.

NEGATIVE OR FAILED RESULTS OFTEN DON'T GET PUBLISHED.

COMMON TYPES OF BIAS

3) **PERFORMANCE BIAS** — HAPPENS WHEN PARTICIPANTS OR RESEARCHERS KNOW WHO IS GETTING WHAT TREATMENT, AND THAT AFFECTS THE OUTCOME.

4) **DETECTION BIAS** — HAPPENS WHEN OUTCOMES ARE ASSESSED DIFFERENTLY FOR DIFFERENT GROUPS.

COMMON TYPES OF BIAS

5) ATTRITION BIAS — HAPPENS WHEN PARTICIPANTS DROP OUT, AND THE MISSING DATA AFFECTS RESULTS.

6) DETECTION BIAS — HAPPENS WHEN OUTCOMES ARE ASSESSED DIFFERENTLY FOR DIFFERENT GROUPS.

HOW TO AVOID BIAS (SIMPLE WAYS)

- **USE RANDOM SELECTION FOR PARTICIPANTS OR STUDIES.**
- **INCLUDE UNPUBLISHED STUDIES AND GRAY LITERATURE TO REDUCE PUBLICATION BIAS.**
- **FOLLOW A CLEAR PROTOCOL BEFORE STARTING YOUR REVIEW (LIKE PROSPERO REGISTRATION).**
- **USE BLINDING IN STUDIES SO PARTICIPANTS AND RESEARCHERS DON'T KNOW WHO GETS WHAT.**
- **USE MULTIPLE REVIEWERS TO SCREEN AND EXTRACT DATA IN A SYSTEMATIC REVIEW.**
- **REPORT ALL RESULTS HONESTLY, NOT JUST THE ONES THAT LOOK GOOD.**
- **ASSESS RISK OF BIAS USING PROPER TOOLS LIKE COCHRANE'S RISK OF BIAS TOOL.**

CITATION

INTRODUCTION TO CITATION MANAGEMENT

- **PURPOSE:** ORGANIZE ARTICLES, GENERATE CITATIONS, AVOID PLAGIARISM
- **TOOL:** ZOTERO (FREE & OPEN SOURCE)
- **FEATURES:**
 - BROWSER PLUGIN FOR SAVING ARTICLES
 - WORD/GOOGLE DOCS PLUGIN FOR CITATIONS
 - ORGANIZE BY FOLDERS AND TAGS

COMMON CITATION MISTAKES

- **WRONG FORMATTING STYLE**
- **MISSING AUTHORS OR YEARS**
- **CITING A WEBSITE INSTEAD OF A JOURNAL ARTICLE**
- **COPY-PASTING CITATIONS WITHOUT VERIFICATION**

ZOTERO HELPS AVOID THESE IF USED PROPERLY.

BEST PRACTICES FOR SEARCHING & CITING

- START WITH A **CLEAR, TESTED SEARCH STRATEGY**
- **DOCUMENT EVERYTHING**
- SAVE ALL RELEVANT PDFS AND NOTES IN **ZOTERO**
- **REVIEW YOUR SEARCH STRATEGY WITH A PEER/MENTOR**



Thank you for having you guys!!!

**SEE YOU AT
WORKSHOP!!!**