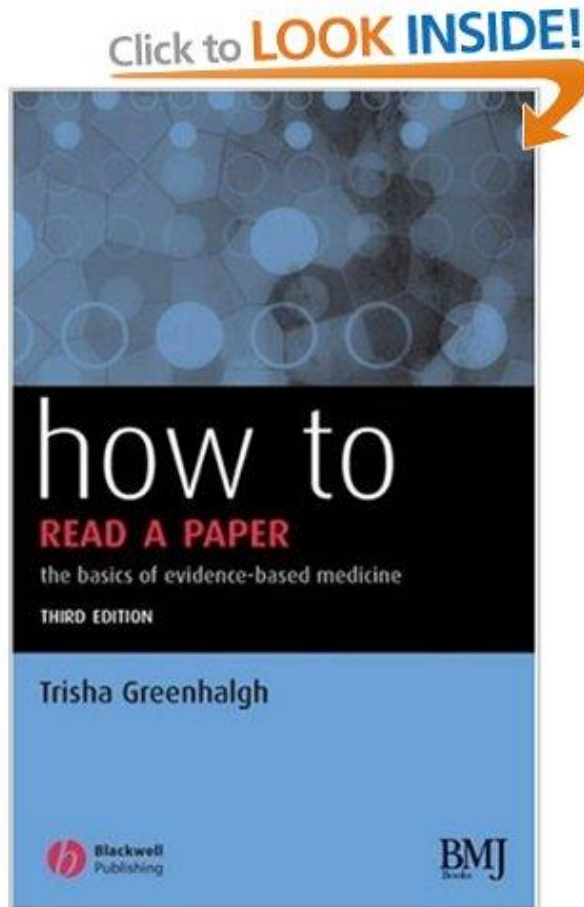# How to read a paper

D. Singh-Ranger

Academic viva

- 2 papers
- 1 hour to read both
- Viva on both papers
- Summary-what is the paper about

What is the paper about

THREE Questions to ask yourself

1. Why was the study done?

Clinical question?

- Why was study done
  - What clinical question(s) being addressed by paper
  - What is the hypothesis – addressed in methods section

2. What type of study was done?

Type of study

- Primary – reports research first hand
  - Experimental: animal
  - Clinical trial: intervention (e.g. drug)
  - Surveys
- Secondary – summarizes and concludes from published primary studies

Design
Primary studies

Parallel group comparison	Different treatments. Results groups compared
Paired comparison	Different treatments. Subjects matched
Within subject comparison	Each subject Before and after
Single blind	Subject blinded to treatment
Double blind	Subject and investigators blinded
Crossover	Control and intervention with washout period
Placebo controlled	Controls get placebo
Factorial design	Effects of >1 independent variable both separately and combined on a given outcome

Design
Secondary studies

Systematic review	
Meta-analysis	
Guidelines	Management recommendations from primary studies
Decision analysis	Probability trees in making choices about clinical management
Economic analysis	About resources

3. Was the design appropriate to the research?

Field	Preferred trial
Therapy	RCT
Diagnosis	Cross sectional survey
Screening	Cross sectional survey
Prognosis	Longitudinal cohort study
Causation	Case control study

Methodology

SIX Questions to ask yourself

1. Was the study original?

- Unlikely so best ask yourself
- Does it add to literature in any way
  - E.g.
    - larger numbers
    - Longer follow up
    - Population
    - More robust methodology

2. Whom is the study about?

Entails:

- Recruitment methods
- Inclusion criteria
- Exclusion criteria
- How were they studied? E.g. constant access to key investigator, new equipment not generally available, explanations

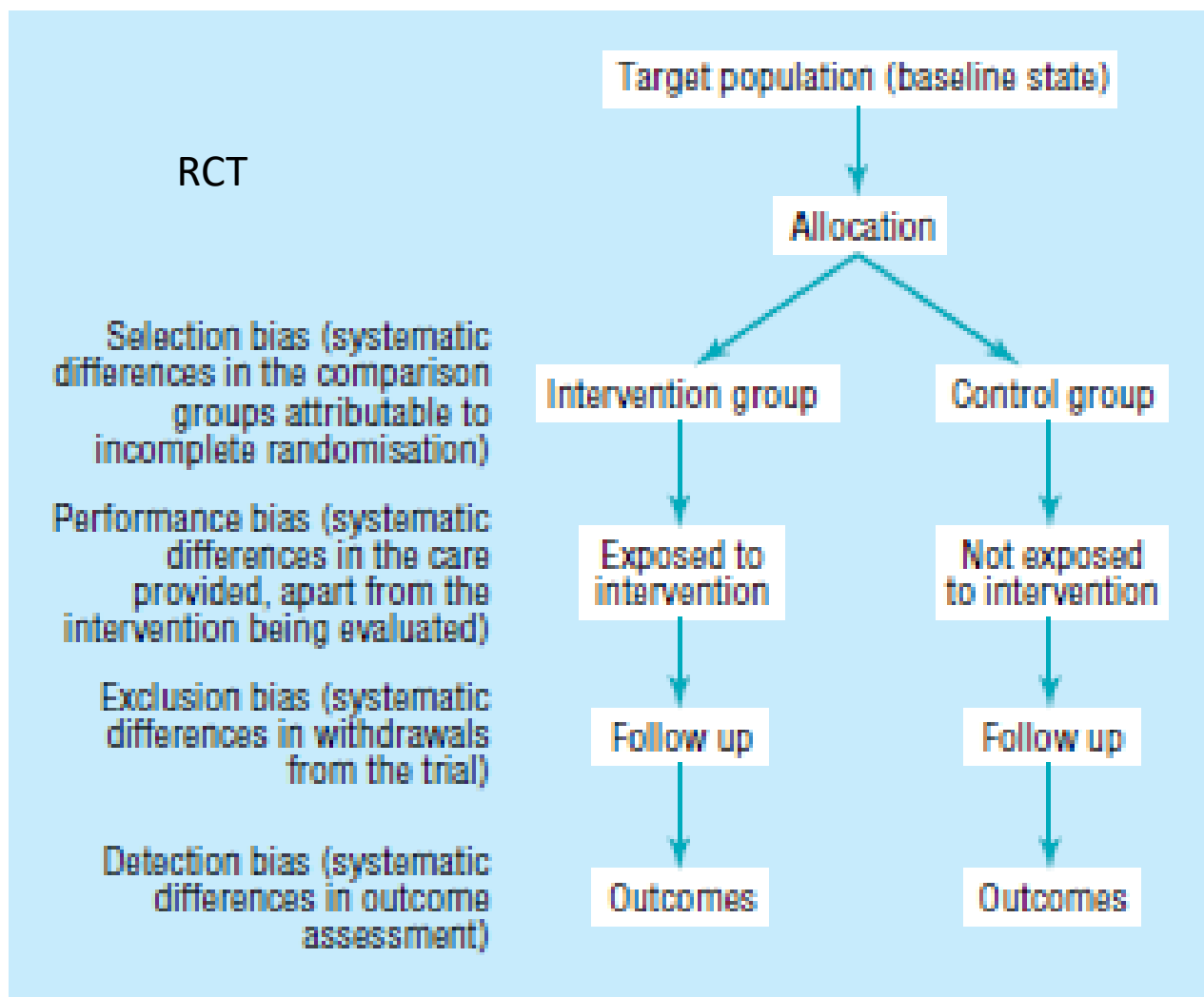# 3. Was the design of the study sensible?

- What intervention being considered
  - Comparison?
- Outcome measure?
  - Surrogate v true measure

  - Also consider validated methods for subjective outcome measures

4. Was systematic bias avoided/minimised?

- Anything that erroneously influences or distorts conclusions and comparisons

Examples of systematic bias?

5. Was the assessment blind?

6. Important statistical questions (i.e. are the results credible?)

- Sample size
- Duration of follow-up
- Completeness of follow-up
  - Intention to treat analysis

Others

- Impact factor
- Definitions
  - Incidence v Prevalence
  - Type 1 and 2 errors
  - Power
  - Positive and negative predictive values
  - Confidence intervals
  - Risk, Odds ratio, Number needed to treat
  - Correlation v causation
- CONSORT (Consolidated Standards of Reporting Trials)
- PRISMA for Systematic reviews and meta- analysis

Essentials

Need to know
'you may get asked'

1. Impact Factor

Definition

Total number of times articles were cited in preceding 2 years

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Total number of citable articles in those 2 years

• Proxy for relative importance of journal in its field

Influencing factors

- Including items that result in more citations:
  – Reviews
- Publishing articles that cite papers in last 2 years ('gaming' the system)
- Publishing a higher fraction of articles that are likely to be cited earlier in the year
- Coercive citation – citing your own papers
- Limiting number of citable items (not publishing case reports)

2. Incidence

- Rate of occurrence of new cases of a disease

$$\frac{\text{Number of new cases of disease in one year}}{\text{Size of population}}$$

- Expressed as % or number of cases per 100 000

3. Prevalence

- Proportion of people that suffer from the disease at one point in time

$$\frac{\text{Number of individuals with disease in one year}}{\text{Number of individuals examined}}$$

- Expressed as % or number of cases per 100 000

Essential statistics

Errors

Type I – α

- Failure to accept null hypothesis

- FALSE POSITIVE

Type II – β

- Failure to reject null hypothesis

- FALSE NEGATIVE