

# Checklists for reading a paper

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## Checklist to determine what the paper is about

Why was the study done (what clinical question did it address)?

What type of study was done?

- Primary research (experiment, randomized controlled trial, other controlled clinical trial, cohort study, case-control study, cross-sectional survey, longitudinal survey, case report or case series)?
- Secondary research (simple overview, systematic review, meta analysis, decision analysis, guideline development, economic analysis)?

Was the study design appropriate to the broad field of research addressed (therapy, diagnosis, screening, prognosis, causation)?

Was the study ethical?

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## Checklist for the methods section

Was the study original?

Who is the study about?

- How were the subjects recruited?
- Who was included in, and who was excluded from, the study?
- Were the subjects studied in 'real life' circumstances?

Was the design of the study sensible?

- What intervention or other maneuver was being considered?
- What outcome(s) were measured, and how?

Was the study adequately controlled?

- If a 'randomized trial', was randomization truly random?
- If a cohort, case-control or other non-randomized comparative study, were the controls appropriate?
- Was the assessment of outcome (or, in a case-control study, allocation of caseness) 'blind'?

Was the study large enough, and continued for long enough, and was follow-up complete enough, to make the results credible?

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## Checklist for the statistical aspects of the paper

Have the authors set the scene correctly?

- Have they determined whether their groups are comparable and, if necessary, adjusted from baseline differences?
- What sort of data have they got and have they used appropriate statistical tests?
- If statistical tests in the paper are obscure, why have the authors chosen to use them?
- Have the data been analyzed according to the original study protocol?

Paired data, tails, and outliers

- Were paired tests performed on paired data?
- Was a two tailed test performed whenever the effect of an intervention could conceivably be a negative one?
- Were outliers analyzed with both common sense and appropriate statistical adjustments?

Correlation, regression, and causation

- Has correlation been distinguished from regression and has the correlation coefficient ('r value') been calculated and interpreted correctly?
- Have assumptions been made about the nature and direction of causality?

Probability and confidence

- Have 'p values' been calculated and interpreted appropriately?
- Have confidence intervals been calculated and do the authors' conclusions reflect them?

Have the authors expressed their results in terms of the likely harm or benefit which an individual patient can expect, such as:

- Relative risk reduction?
- Absolute risk reduction?
- Number needed to treat?
- Odds ratio?

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## Checklist for a paper validating a diagnostic or screening test

Is this test potentially relevant to my practice?

Has the test been compared with a true gold standard?

Did this validation study include an appropriate spectrum of subjects?

Has work up bias been avoided?

Has observer bias been avoided?

Was the test shown to be reproducible both within and between observers?

What are the features of the test as derived from this validation study?

Were confidence intervals given for sensitivity, specificity, and other features of the test?

Has a sensible 'normal range' been derived from these results?

Has this test been placed in the context of other potential tests in the diagnostic sequence for the condition?

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## Assessing the effects of an intervention

	Outcome event		Total
	Yes	No	
Control Group	a	b	a + b
Intervention Group	c	d	c + d

Risk of outcome event in control group =  $a/a+b = x$

Risk of outcome event in intervention group =  $c/c+d = y$

Relative risk reduction =  $x/y = a/(a+b) \times (c+d)/c$

Absolute risk reduction =  $x - y$

Number needed to treat =  $1/x - y$

Odds ratio (likelihood ratio) =

Odds of outcome event vs odds of no event in intervention group

Odds of outcome event vs odds of no outcome event in control group

The outcome event can be desirable (e.g. cure) or undesirable (e.g. an adverse drug reaction). In the latter case, it is semantically preferable to refer to the relative or absolute risk increase.

From:

Greenhalgh, Trisha. **How to read a paper: the basics of evidence based medicine**. 2<sup>nd</sup> Edition. London: BMJ, 2001.