

**THERAPY STUDY: Are the results of the trial valid? (Internal Validity)**

**What question did the study ask?**

- Patients –
- Intervention -
- Comparison -
- Outcome(s) –

<b>1a. R- Was the assignment of patients to treatments randomised?</b>	
What is best?	Where do I find the information?
<i>Centralised computer randomisation</i> is ideal and often used in multi-centred trials. Smaller trials may use an <i>independent</i> person (e.g, the hospital pharmacy) to “police” the randomization.	The <b>Methods</b> should tell you how patients were allocated to groups and whether or not randomisation was concealed.
This paper: Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Comment:	
<b>1b. R- Were the groups similar at the start of the trial?</b>	
What is best?	Where do I find the information?
If the randomisation process worked (that is, achieved comparable groups) the groups should be similar. The more similar the groups the better it is. There should be some indication of whether differences between groups are statistically significant (ie. p values).	The <b>Results</b> should have a table of "Baseline Characteristics" comparing the randomized groups on a number of variables that could affect the outcome (ie. age, risk factors etc). If not, there may be a description of group similarity in the first paragraphs of the <b>Results</b> section.
This paper: Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Comment:	
<b>2a. A – Aside from the allocated treatment, were groups treated equally?</b>	
What is best?	Where do I find the information?
Apart from the intervention the patients in the different groups should be treated the same, eg., additional treatments or tests.	Look in the <b>Methods</b> section for the follow-up schedule, and permitted additional treatments, etc and in <b>Results</b> for actual use.
This paper: Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Comment:	
<b>2b. A – Were all patients who entered the trial accounted for? – and were they analysed in the groups to which they were randomised?</b>	
What is best?	Where do I find the information?
Losses to follow-up should be minimal – preferably less than 20%. However, if few patients have the outcome of interest, then even small losses to follow-up can bias the results. Patients should also be analysed in the groups to which they were randomised – ‘ <i>intention-to-treat analysis</i> ’.	The <b>Results</b> section should say how many patients were randomised (eg., Baseline Characteristics table) and how many patients were actually included in the analysis. You will need to read the results section to clarify the number and reason for losses to follow-up.
This paper: Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Comment:	
<b>3. M - Were measures objective or were the patients and clinicians kept “blind” to which treatment was being received?</b>	
What is best?	Where do I find the information?
It is ideal if the study is ‘double-blinded’ – that is, both patients and investigators are unaware of treatment allocation. If the outcome is <i>objective</i> (eg., death) then blinding is less critical. If the outcome is <i>subjective</i> (eg., symptoms or function) then blinding of the outcome assessor is critical.	First, look in the <b>Methods</b> section to see if there is some mention of masking of treatments, eg., placebos with the same appearance or sham therapy. Second, the <b>Methods</b> section should describe how the outcome was assessed and whether the assessor/s were aware of the patients' treatment.

This paper: Yes  No  Unclear   
Comment:

## What were the results?

1. How large was the treatment effect?	
<p>Most often results are presented as dichotomous outcomes (yes or not outcomes that happen or don't happen) and can include such outcomes as cancer recurrence, myocardial infarction and death. Consider a study in which 15% (0.15) of the control group died and 10% (0.10) of the treatment group died after 2 years of treatment. The results can be expressed in many ways as shown below.</p>	
What is the measure?	What does it mean?
<p><b>Relative Risk (RR)</b> = risk of the outcome in the treatment group / risk of the outcome in the control group.</p> <p>In our example, the <math>RR = 0.10/0.15 = 0.67</math></p>	<p>The relative risk tells us <b>how many times more likely</b> it is that an event will occur in the treatment group relative to the control group. An <b>RR of 1</b> means that there is no difference between the two groups thus, the treatment had <b>no effect</b>. An <math>RR &lt; 1</math> means that the treatment decreases the risk of the outcome. An <math>RR &gt; 1</math> means that the treatment increased the risk of the outcome.</p> <p>Since the <math>RR &lt; 1</math>, the treatment decreases the risk of death.</p>
<p><b>Absolute Risk Reduction (ARR)</b> = risk of the outcome in the control group - risk of the outcome in the treatment group. This is also known as the <b>absolute risk difference</b>.</p> <p>In our example, the <math>ARR = 0.15 - 0.10 = 0.05</math> or 5%</p>	<p>The absolute risk reduction tells us the absolute difference in the rates of events between the two groups and gives an indication of the baseline risk and treatment effect. An <b>ARR of 0</b> means that there is no difference between the two groups thus, the treatment had <b>no effect</b>.</p> <p>The absolute benefit of treatment is a 5% reduction in the death rate.</p>
<p><b>Relative Risk Reduction (RRR)</b> = absolute risk reduction / risk of the outcome in the control group. An alternative way to calculate the RRR is to subtract the RR from 1 (eg. <math>RRR = 1 - RR</math>)</p> <p>In our example, the <math>RRR = 0.05/0.15 = 0.33</math> or 33% Or <math>RRR = 1 - 0.67 = 0.33</math> or 33%</p>	<p>The relative risk reduction is the complement of the RR and is probably the most commonly reported measure of treatment effects. It tells us the reduction in the rate of the outcome in the treatment group relative to that in the control group.</p> <p>The treatment reduced the risk of death by 33% relative to that occurring in the control group.</p>
<p><b>Number Needed to Treat (NNT)</b> = inverse of the ARR and is calculated as <math>1 / ARR</math>.</p> <p>In our example, the <math>NNT = 1/0.05 = 20</math></p>	<p>The number needed to treat represents the number of patients we need to treat with the experimental therapy in order to prevent 1 bad outcome and incorporates the duration of treatment. Clinical significance can be determined to some extent by looking at the NNTs, but also by weighing the NNTs against any harms or adverse effects (NNHs) of therapy.</p> <p>We would need to treat 20 people for 2 years in order to prevent 1 death.</p>

## 2. How precise was the estimate of the treatment effect?

The true risk of the outcome in the population is not known and the best we can do is estimate the true risk based on the sample of patients in the trial. This estimate is called the **point estimate**. We can gauge how close this estimate is to the true value by looking at the confidence intervals (CI) for each estimate. If the confidence interval is fairly narrow then we can be confident that our point estimate is a precise reflection of the population value. The confidence interval also provides us with information about the statistical significance of the result. If the value corresponding to **no effect** falls outside the 95% confidence interval then the result is statistically significant at the 0.05 level. If the confidence interval includes the value corresponding to **no effect** then the results are not statistically significant.

### Will the results help me in caring for my patient? (External Validity/Applicability)

The questions that you should ask before you decide to apply the results of the study to your patient are:

- Is my patient so different to those in the study that the results cannot apply?
- Is the treatment feasible in my setting?
- Will the potential benefits of treatment outweigh the potential harms of treatment for my patient?