

# P-value

A p-value, which stands for probability value, is a statistical measure between 0 and 1. It is used for hypothesis testing. In clinical trials it is used to give an indication of whether a result observed may be due to chance, or not.

A significance level should be set before data collection begins, and is usually set to 5% (or 0.05), although other levels may be used depending on the study.

A result is then said to be statistically significant (and allows us to reject the null hypothesis) if it has a p-value equal to or less than the significance level. This is generally written as  $p \leq 0.05$ .

In calculating the p-value, we first assume that there really is no true difference between the two tested treatments, e.g. new versus standard treatment (the null hypothesis). We then calculate the likelihood (probability) that the difference we have observed is just due to chance if our supposition is true (that is, if there is really no true difference). This is the p-value.

So, the p-value is the probability to observe effects as big as those seen in the study if there was really no difference between the treatments. If p is small, the findings are unlikely to have arisen by chance and we reject the idea that there is no difference between the two treatments (we reject the null hypothesis). If p is large, the observed difference is plausibly a chance finding and we do not reject the idea that there is no difference between the treatments.