

Taking the 'P' out of confidence intervals

In the second of a new series looking at statistical terms, **Chris Cates** explains P values and confidence intervals.

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The chart below shows the results of a Cochrane review looking at whether acute asthma patients can reduce their risk of hospital admission depending on whether they use a spacer or a nebuliser for beta₂-agonists.

The totals in the study (bottom line in the chart) tell us the relative risk of having an admission if a spacer is used is 0.77, with a 95 per cent confidence interval of 0.55 to 1.07 and a P value of 0.11. But what do these statistics mean?

The P (for probability) value simply indicates how likely it is that the result of the study could have arisen by chance alone. In this example, a P value of 0.11 means the result — a decreased risk of hospital admission with spacer — could have arisen by chance in 11 out of 100 cases. This shows the study has not demonstrated a significant difference between the two.

P is considered significant when it is 0.05 or less. Note that the P value tells us nothing about the size of the effect, or the direction of it. For this reason, confidence intervals are now used more often than P values.

The 95% CI tells us how much the play of chance might have altered the result that we found. If more patients are studied, this chance variation becomes smaller and the CI narrows. Here, we can be 95% sure that spacers, on average, lie somewhere between being 45% better in preventing admissions and 7% worse.

This applies to the average effect, and does not reflect how variable the response

may be in individual patients, but it may be enough to persuade readers that spacers are usually as good as nebulisers in acute asthma. Have a look at the review if you are keen for more details!

In the August article, I will consider the ways the size of a treatment effect can be reported in relative and absolute terms.

REFERENCE

Cates CJ, Bara A, Crilly JA, Rowe BH. Holding chambers versus nebulisers for beta-agonist treatment of acute asthma. *The Cochrane Database of Systematic Reviews* 2003, Issue 2. www.cochrane.org/cochrane/revabstr/AB000052.htm

