INFORMATION POINT:

Number Needed to Treat (NNT)

The number needed to treat (NNT) is a way of reporting the results of a randomized controlled trial for which the outcome measure is binary, that is, survive/die or success/failure. In such a trial, comparing a new treatment with a standard treatment, then the number needed to treat is the number of patients we would need to treat with the new treatment to achieve one more success than we would get by treating them with the standard treatment. Cook & Sackett (1995) argue that NNT is clinically easier to interpret than relative risk, odds ratio or risk reduction – the other measures commonly used to report the results of such trials. NNT has become widely used, particularly in the context of clinical trials and systematic reviews.

NNT is calculated as the reciprocal of the difference between the proportion of success on the new treatment and the proportion of success on the old treatment. For example, in Plastow *et al*. (2001) the proportion of children successfully treated (total eradication by day 14) with bug busting (new treatment) is 0.533 and with lotion (standard treatment) is 0.133, so the NNT is $1/(0.533–0.133) = 1/0.4 = 2.5$. That is, for every 2.5 children treated with bug busting rather than lotion we will have one more successful outcome than if the children had been treated with lotion.

As Bland (2000) explains, the smaller the NNT the better the new treatment is in comparison to the standard. The smallest possible value for NNT is 1.0, which would only occur if the new treatment was always successful and the standard treatment was never successful. The NNT cannot be zero, but it can be negative which would indicate that the new treatment is harmful and less successful than the standard treatment. In such a case the number may be called the number needed to harm (NNH). If the new treatment and the standard treatment are equally effective then the NNT will be infinite.

As with any estimate of treatment effect, it is better to present a confidence interval rather than a single value point estimate. Altman (1998) discusses how to calculate and interpret the confidence interval for NNT. This is straightforward for the situation in which the new treatment is significantly better than the standard treatment. However, for the situation in which the two treatments are not significantly different the confidence interval will have two parts. As Bland (2000) comments, this is not exactly intuitive and he provides examples to illustrate the difficulty of interpreting such intervals.

Further reading

Altman D.G. (1998) Confidence intervals for the number needed to treat. *British Medical Journal* **317,** 1309–1312.

Bland J.M. (2000) *An Introduction to Medical Statistics*, 3rd edn. Oxford University Press, Oxford.

Cook R.J. & Sackett D.L. (1995) The number needed to treat: a clinically useful measure of treatment effect. *British Medical Journal* **310,** 452–454.

Plastow L., Luthra M., Powell R., Wright J., Russell D. & Marshall M.N. (2001) Head lice infestation: bug busting vs. traditional treatment. *Journal of Clinical Nursing* **10,** 775–782.

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