

The number needed to treat in pairwise and network meta-analysis and its graphical representation

Summary

There are several methods of determining a *CER* value to calculate the NNT which should be considered carefully, since it may impact the magnitude and direction of the NNT. Methods to graphically represent the NNT are also varied, and selection is crucial to ease interpretation of results.

Implications

We suggest graphical representation of NNT results in a bar plot, Cates plot or forest plot for a single outcome, and in a bubble plot, scatterplot or rank-heat plot for ≥ 2 outcomes. Different plots may be used for different needs. If uncertainty around the NNT should be considered in decision-making, then a bar plot or a forest plot can be used to depict a single outcome. The Cates plot is suggested if the corresponding effect estimate is statistically significant, and the confidence interval is not too wide. When multiple outcomes should be considered, then a rank-heat plot can be used.

Reference: Veroniki AA, Bender R, Glasziou P. et al., The number needed to treat in pairwise and network meta-analysis and its graphical representation. *Journal of Clinical Epidemiology*. 2019 Jul;111:11-22.

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What is the current situation?

- The number needed to treat (NNT) is an absolute measure of effect used to communicate the effectiveness or safety of an intervention in both pairwise (PMA) and network meta-analysis (NMA)
- Selection of a single control event rate (*CER*) which is needed for the NNT calculation may present a barrier due to differences in baseline risks, lengths of follow-up, outcome definitions, and clinical settings across studies included in a PMA or NMA, and can impact the magnitude and direction of the NNT
- Attempts have been made to graphically represent NNTs to ease interpretation of results; however, these approaches are varied

What is the objective?

- To discuss common approaches to select a *CER* for calculation of the NNT
- To illustrate six graphical methods for representing the NNT, and discuss their properties

What did the study find?

- There exist several methods of selecting a *CER* value for the NNT calculation, including mean *CER* across studies, pooled *CER* in PMA, expert opinion-based *CER*, and a range of possible *CER* values
- In the presence of small to moderate heterogeneity, the use of several *CER* values is suggested, e.g. for low- and high-risk patients
- A NNT may be presented in a bar plot, Cates plot or forest plot for a single outcome, and a bubble plot, scatterplot or rank-heat plot for ≥ 2 outcomes
- It may be difficult to read NNT values with small circles (which are proportional to the relevant treatment effect estimates) in a bubble plot, whereas a scatterplot cannot be produced when different treatments (or treatment comparisons) are included in the underlying outcomes
- The Cates plot, bubble plot, and rank-heat plot do not depict the NNT uncertainty, which can impact interpretation
- Different plots may be used for different needs, along with consideration of the different properties associated with each plot