**Editorial**

**Weighted event rates**

When reporting results for dichotomous outcomes (for example, alive or dead) of systematic reviews, the event rates are labelled “weighted event rates.” This weight reflects the relative contributions of individual studies to the overall risk difference, which is then used to compute the numbers needed to treat (NNTs).

The main factor in determining the weight for a trial is the number of events, which in turn depends on sample size, the event rate, and duration of follow-up. Trials with more events get more weight. The number of events and total number of patients in each of the treatment arms are combined into a single statistical concept called variance. Variances can be calculated for the event rates in each of the treatment arms, for the risk difference between the treatment groups, or for the relative risk. A good example of a weight would then be 1/variance.

Computer software is available to do most of the computations (e.g., RevMan, SAS, and Stata). For a fixed-effects model, RevMan (which is probably familiar to most reviewers) will generate a Mantel–Haenszel risk difference together with a corresponding weight for each of the trials, whereas the DerSimonian and Laird method is used for the random-effects model (1).

A review by van Dongen and colleagues (2) (abstracted in this issue of ACP Journal Club) illustrates the principles with incidence of recurrent venous thromboembolism at 3 months (Figure).

The weighted risk difference between the treatment and control groups is obtained by adding an individual trial’s weight times the risk difference as follows: (1.04% of $-0.07$) + (2.36% of $-0.04$) + (2.57% of $-0.04$) + (2.99% of $-0.04$) + (4.60% of $-0.01$) + (7.03% of $-0.01$) + (7.04% of $-0.01$) + (7.60% of $-0.04$) + (8.80% of $-0.01$) + (10.77% of 0.00) + (13.42% of $-0.05$) + (13.83% of 0.00) + (17.96% of 0.00) = –0.02 (95% CI, –0.02 to –0.01). (It is noteworthy that in this case, a linear relationship exists between sample size and the weights.)

The overall event rate in the control (unfractionated heparin) group is calculated by simply pooling the results to give 149/2809 = 5.30%. The overall experimental event rate is obtained by subtracting the weighted risk difference from the control event rate (i.e., 5.30% –2.00% = 3.30%). Both rates are subsequently labelled “weighted event rates.” (In the case of a risk increase, the weighted risk difference is added to the control event rate to get the weighted experimental event rate.) Weighted and unweighted event rates from this example are presented in the Table.

### References


From Reference 2, with permission.