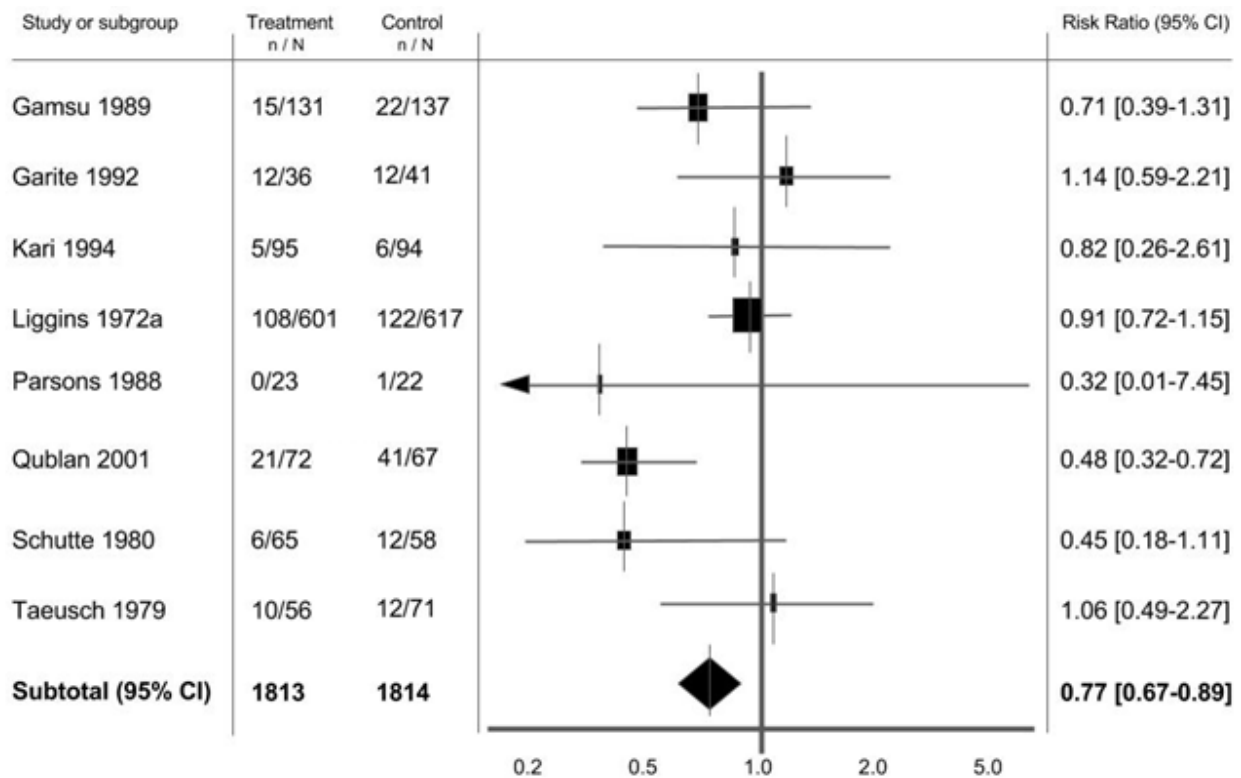


Making Sense of Biostatistics: Blobbograms

By Elaine Eisenbeisz

Blobbograms, also known as “forest plots” and “box-and-whisker plots,” can be used to visually assess the results of multiple clinical trials in a clinical research program or in a meta-analysis. Blobbograms come in a variety of styles. The blobbogram below, along with the accompanying text, is especially informative.

This figure, from a meta-analysis by Roberts et al.^{1,2} summarizes the results of eight studies on the administration of corticosteroids to women at risk of preterm birth and the occurrence of systemic infections for the infants in the first 48 hours of life:



There are four columns in this figure:

- The first column identifies the studies by the name of the lead author and year of publication.
- The second column shows the number of subjects in the treatment and control groups who had the outcome of interest (n), as well as the total number of subjects in the two arms of the study (N). For example: The Gamsu study had a total of N = 131 infants in the treatment group, of which 15 had a systemic infection in the first 48 hours of life (the outcome of interest).
- The third column contains the blobbogram.

- The fourth column presents the risk ratios (RRs) found by the studies, along with their 95% confidence intervals. In this example, the risk ratio compares the likelihood of the desired outcome in the treatment and control groups. A risk ratio of 0.5 means that subjects in the treatment arm are half as likely to have a bad outcome as subjects in the control arm.

Let's look back at the blobbogram in the third column. The dark vertical line in the middle of the blobbogram is the "line of null effect." In this example, a "null effect" means there was no difference between the treatment and control groups, which occurs when the risk ratio is equal to 1. A null effect means the treatment did not work — bad news, but at least it did not make the subjects' conditions worse.

If a study falls to the **left side of the line** of null effect (risk ratio < 1), the study favored treatment. Good news!

If a study falls to the **right side of the line** of null effect (risk ratio > 1), the study favored control. Bad news!

If a study **crosses the line** of null effect, then we have non-significance (null effect).

The horizontal axis line represents the range of values. (Note that, in this blobbogram, the scale is not linear.) Again, a RR value of 1.0 means no difference was found between treatment and control.

The squares represent the RRs found in the studies. Bigger squares mean more data, i.e., bigger studies. The 95% confidence intervals of the RRs are represented by the horizontal lines. Longer lines mean wider confidence intervals. The line for the Parsons study is so long that it runs off the left edge of the blobbogram.

The meta-analysis should, thus, give more weight to studies with the biggest boxes and the shortest lines. In this example, the studies with the biggest boxes also have the shortest lines, which makes sense.

We now arrive at the Subtotal row at the bottom of the blobbogram. The subtotal combines all eight studies into one summary statistic. (This blobbogram has a Subtotal row instead of a Total row because only eight of the 30 studies in the entire meta-analysis were applicable to this outcome of interest.) The vertical line going down the middle of the diamond indicates the point estimate, taking into account all eight studies. The left and right tips of the diamond indicate the 95% confidence interval of this estimate. (The size of the diamond does not indicate the size of the sample.)

In this example, the diamond does not cross the line of null effect and is to the left of the line, meaning that combining and weighting the eight studies demonstrates that the treatment was, indeed, effective. The numbers in the fourth column (RR = 0.77, 95% CI for RR (0.67, 0.89)) support this conclusion.

References

1. Cantley, Nathan. (2016, July 11) Retrieved from <http://www.students4bestevidence.net/tutorial-read-forest-plot/>.
2. Roberts D, Dalziel SR. Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth. Cochrane Database of Systematic Reviews 2006, Issue 3. Art. No.: CD004454.

Author

Elaine Eisenbeisz, MS, is Owner & Principal Omega Statistics. Contact her at 1.951.461.7226 x101 or elaine@omegastatistics.com.