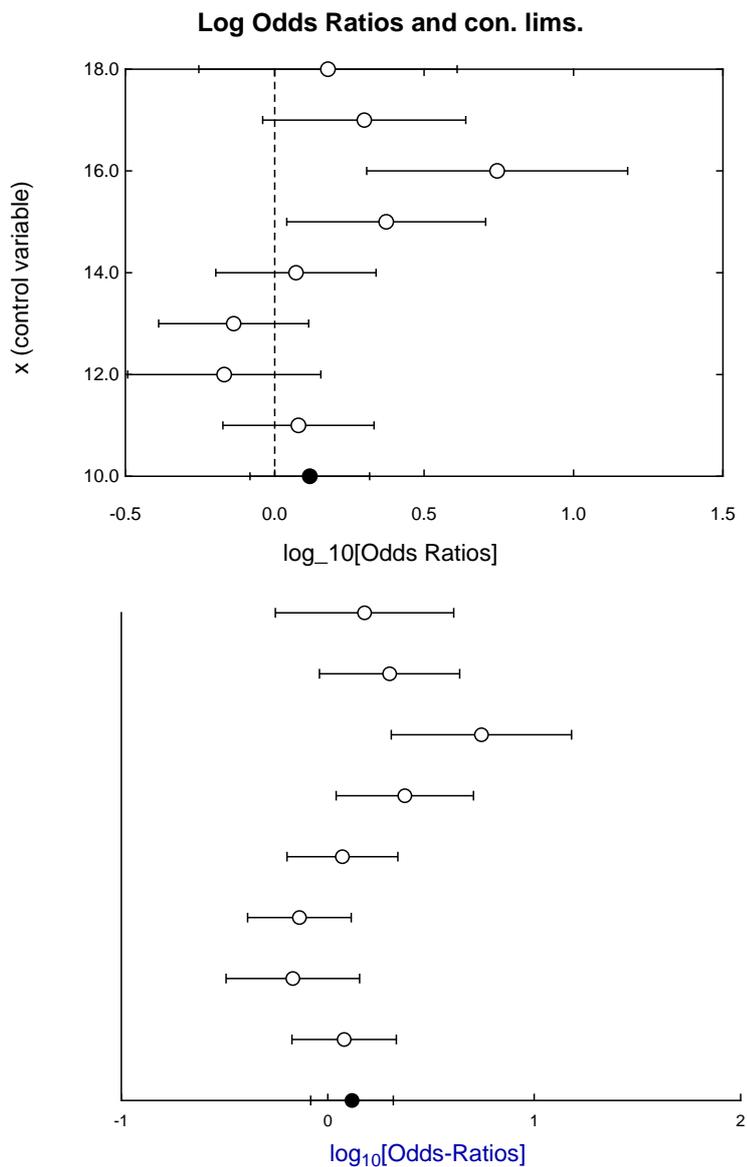




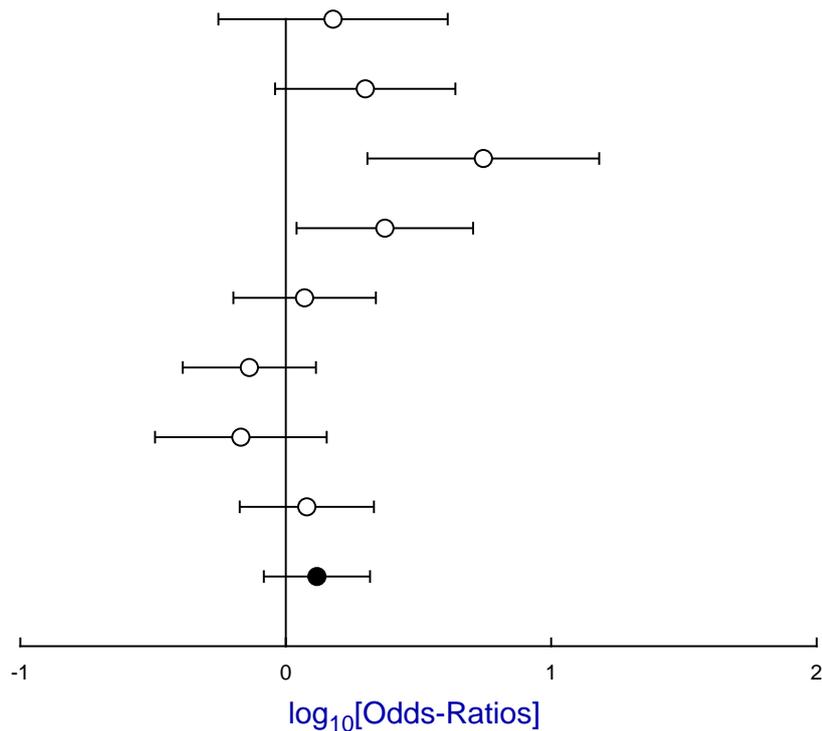
Tutorials and worked examples for simulation,  
curve fitting, statistical analysis, and plotting.  
<http://www.simfit.org.uk>

The log odds ratios plot is used to display groups of ratios of odds (i.e. successes/failures) in sequences of binomial investigations, such as in meta analysis. Usually a logarithmic scale to base 10 is used in order to facilitate analysis of the differences in orders of magnitude. This tutorial also demonstrates an important difference between using graphics configuration files in **template** mode and in **comprehensive** mode.

Using program **simstat** in meta analysis mode with the test data in `meta.tf2` (instead of the default data set `meta.tf1`) displays the following graph, which is followed by the results from transferring to advanced editing then reading in the configuration file `logoddsratios.cfg` in the **template** mode.



However, reading in the configuration file `logoddsratios.cfg` in the **comprehensive** mode as a short cut to tedious editing results in the next more detailed graph.



The difference between this plot and the previous one highlights the difference between using a configuration file in **template** mode and in **comprehensive** mode.

In **template** mode the position and range of axes together with the number of tick marks is calculated from the existing data and is therefore applicable to any meta analysis data. In meta analysis we have pairs of binomial analyses in order to determine if groups of pairs of data sets represent the same ratio of successes to failures, rather than equality of binomial parameter estimates. For instance, sample 1 would have  $y_1$  successes in a sample size of  $N_1$  giving the parameter estimate  $\hat{p}_1 = y_1/N_1$ , while sample 2 would generate the estimate  $\hat{p}_2 = y_2/N - 2$ .

So the log odds ratios being compared between groups would be

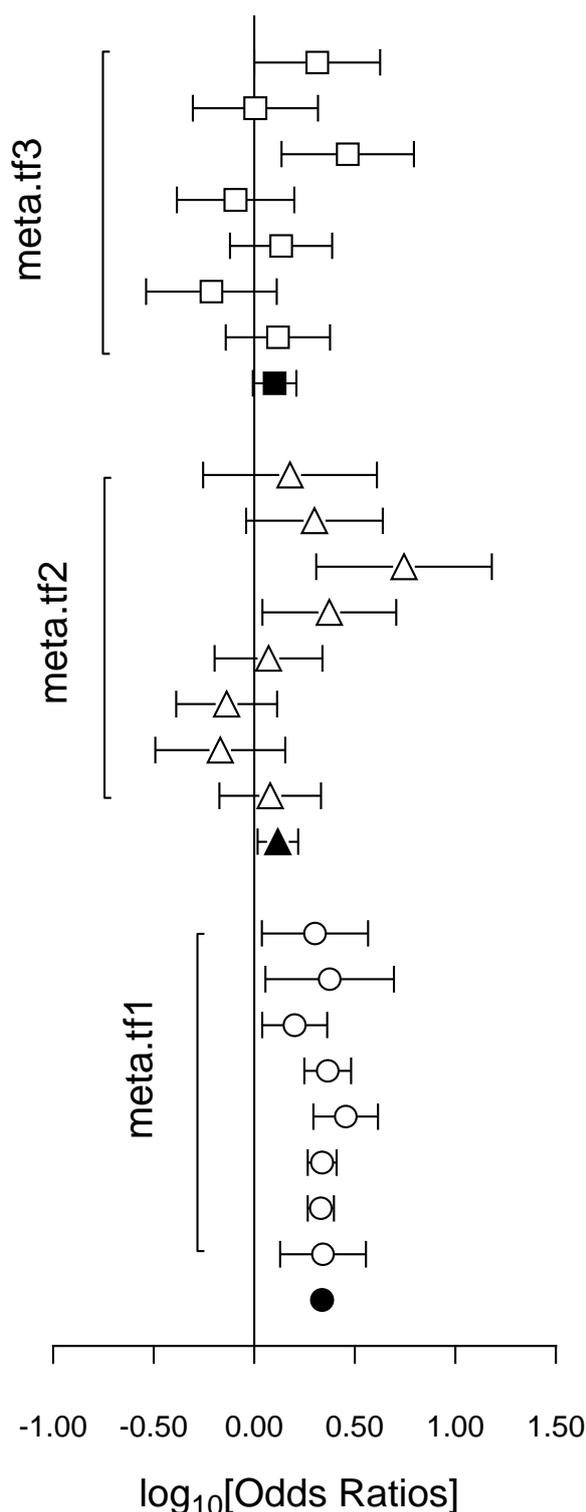
$$\text{Log Odds Ratio in each group} = \log_{10} \left( \frac{\hat{p}_1 / (1 - \hat{p}_1)}{\hat{p}_2 / (1 - \hat{p}_2)} \right)$$

and this illustrates an important point.

Because the **comprehensive** mode imposes the coordinate ranges that were current when the configuration file was created for test data file `meta.tf2`, it re-imposes the choice that was made to suppress the original dashed line added to indicate equal odds within groups, i.e. log odds ratios of 0, move the y axis to a value of 0, and in addition to increase the range covered by the y axis to separate the pooled sample estimate from the x axis.

Another feature of plotting meta analysis data is the intention to display groups of such 2 by 2 contingency tables stacked vertically so as to emphasize differences an similarities between competing studies, for instance in so-called evidence based medicine, i.e. clinical trials. An example will now be presented to illustrate how to do this using `SIMFIT`.

## Plotting combined meta analysis results



It is often useful to plot Log-Odds-Ratios, so the creation of the adjacent figure will be outlined.

### (1) The data

Test files `meta.tf1`, `meta.tf2`, and `meta.tf3` were analyzed in sequence using the `SIMFIT` Meta Analysis procedure. Note that, in these files, column 3 contains spacing coordinates so that data will be plotted consecutively.

### (2) The ASCII coordinate files

During Meta Analysis,  $100(1-\alpha)\%$  confidence limits on the Log-Odds-Ratio resulting from a 2 by 2 contingency tables with cell frequencies  $n_{ij}$  can be constructed from the approximation  $\hat{e}$  where

$$\hat{e} = Z_{\alpha/2} \sqrt{\frac{1}{n_{11}} + \frac{1}{n_{12}} + \frac{1}{n_{21}} + \frac{1}{n_{22}}}$$

When Log-Odds-Ratios with error bars are displayed, the overall values (shown as filled symbols) with error bars are also plotted with a  $x$  coordinate one less than smallest  $x$  value on the input file. For this figure, error bar coordinates were transferred into the project archive using the [Advanced] option to save ASCII coordinate files.

### (3) Creating the composite plot

Program `simplot` was opened and the six error bar coordinate files were retrieved from the project archive. Experienced users would do this more easily using a library file of course. Reverse y-semilog transformation was selected, symbols were chosen, axes, title, and legends were edited, then half bracket hooks identifying the data were added as arrows and extra text.

### (4) Creating the PostScript file

Vertical format was chosen then, using the option to stretch PostScript files, the  $y$  coordinate was stretched by a factor of two.

### (5) Editing the PostScript file

To create the final PostScript file for  $\text{\LaTeX}$  a tighter bounding box was calculated using `gsview` then, using `notepad`, clipping coordinates at the top of the file were set equal to the `BoundingBox` coordinates, to suppress excess white space. This can also be done using the [Style] option to omit painting a white background, so that PostScript files are created with transparent backgrounds, i.e. no white space, and clipping is irrelevant.