Improving Forest/Caterpillar Plots

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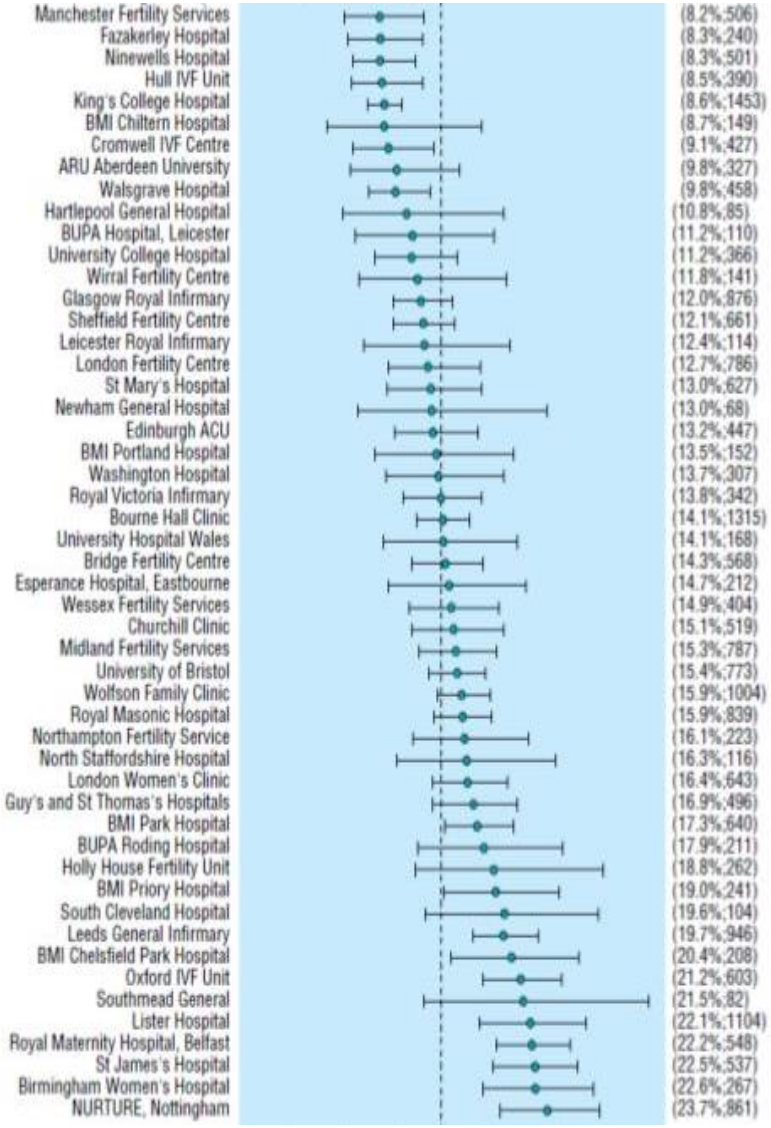
Example Caterpillar Plot

w.icnarc.org



Typical Uses and Interpretations

- Display data from “league tables” that rank institutions
- Display data from meta-analysis
- Interpretations
  - Accuracy of each mean or other estimate
  - Comparison of two means based on overlap
- Note: one is correct, the other not

Outline of Method

$$V_{diff} = V_1 + V_2 = 2V$$

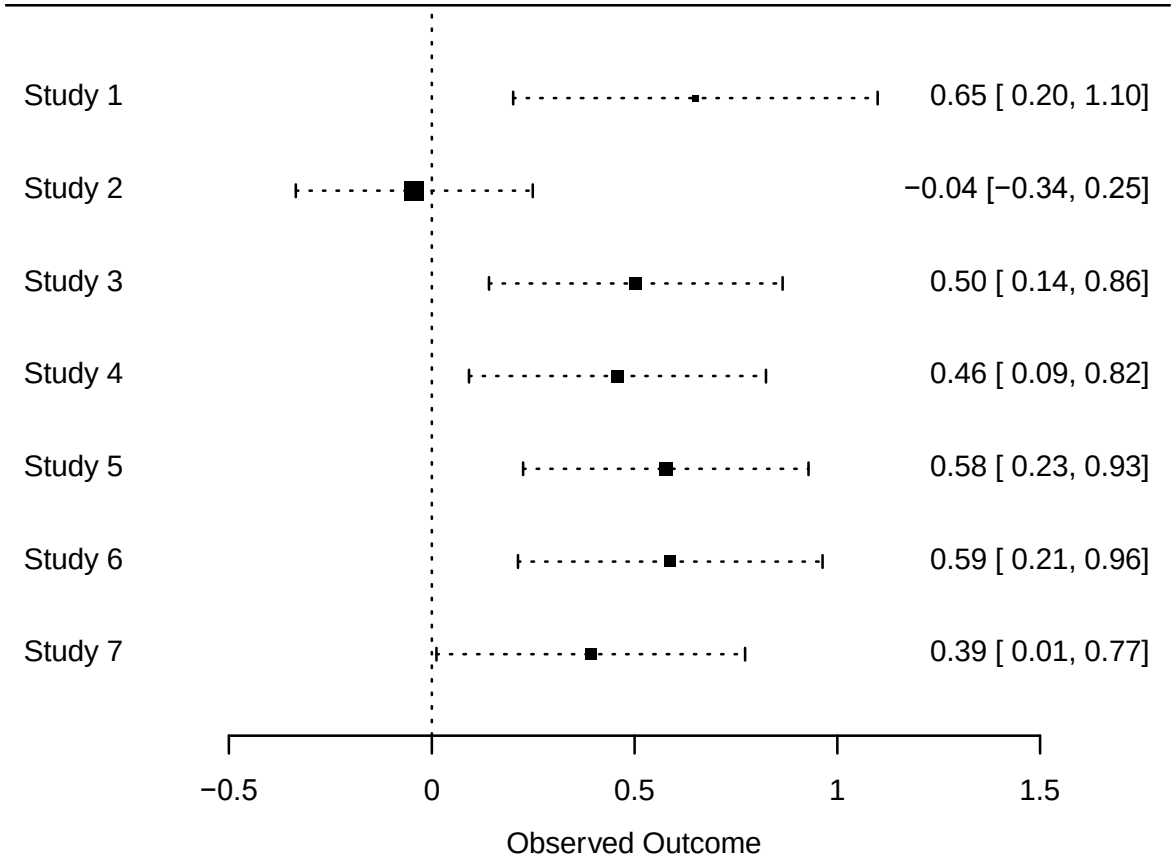
$$SE_{diff} = \sqrt{2}SE \approx 1.4SE$$

- Means would have to differ by
  2 SE_{diff} = 2(1.4) SE to be significant
- Thus we need intervals based on 1.4 SE, not 2 (or 1.96) SE
- For a normal distribution, this is an 84% interval

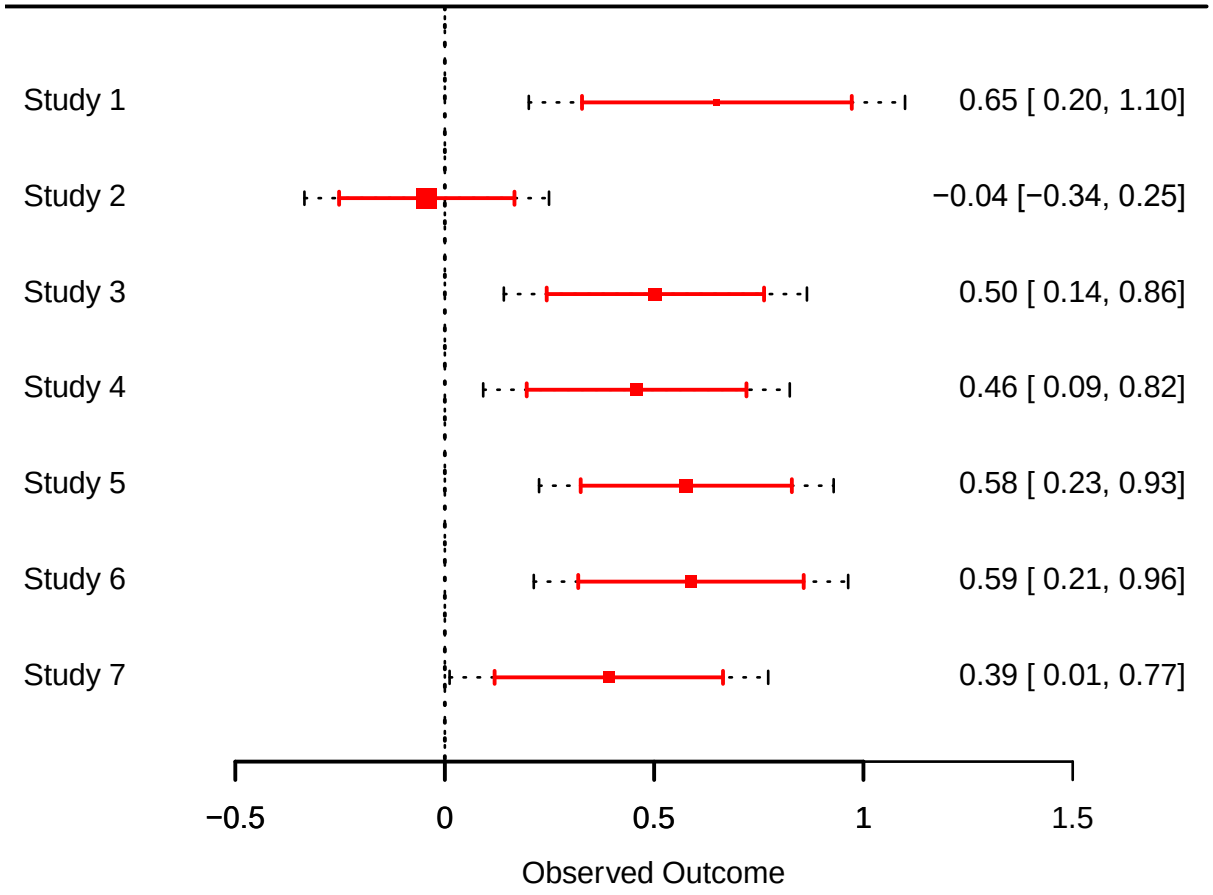
Ref and Procedure

- Goldstein H, Healy MJR. (1995). The graphical presentation of a collection of means. *Journal of the Royal Statistical Society A*, *158*, 175–177.
- Ideally: display both 84% and 95% intervals
- Method 1: Modify plot function `forest()` in R package metafor (Viechtbauer)
- Method 2: Use built-in metafor functions
- https://www.metafor-project.org/doku.php/plots:forest_plot_with_multiple_cis

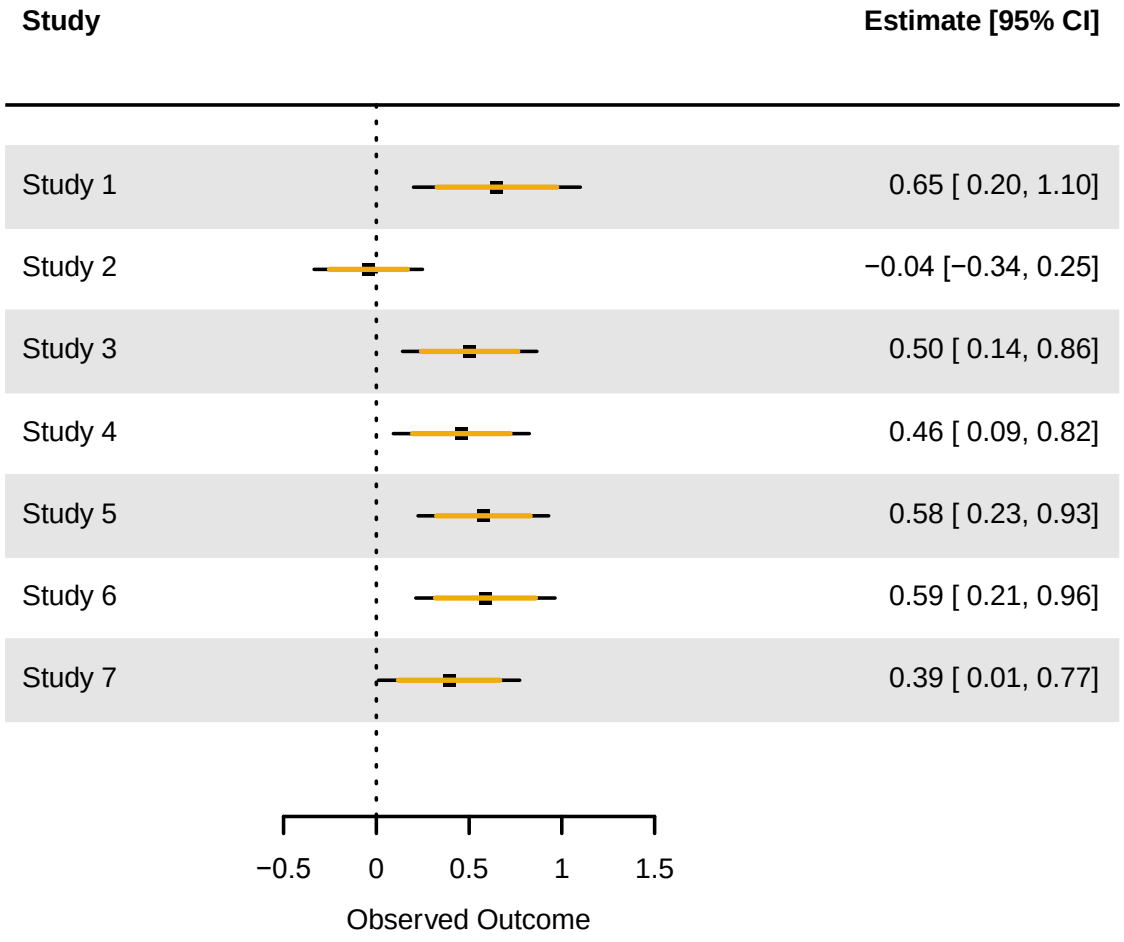
Small example
Usual forest plot



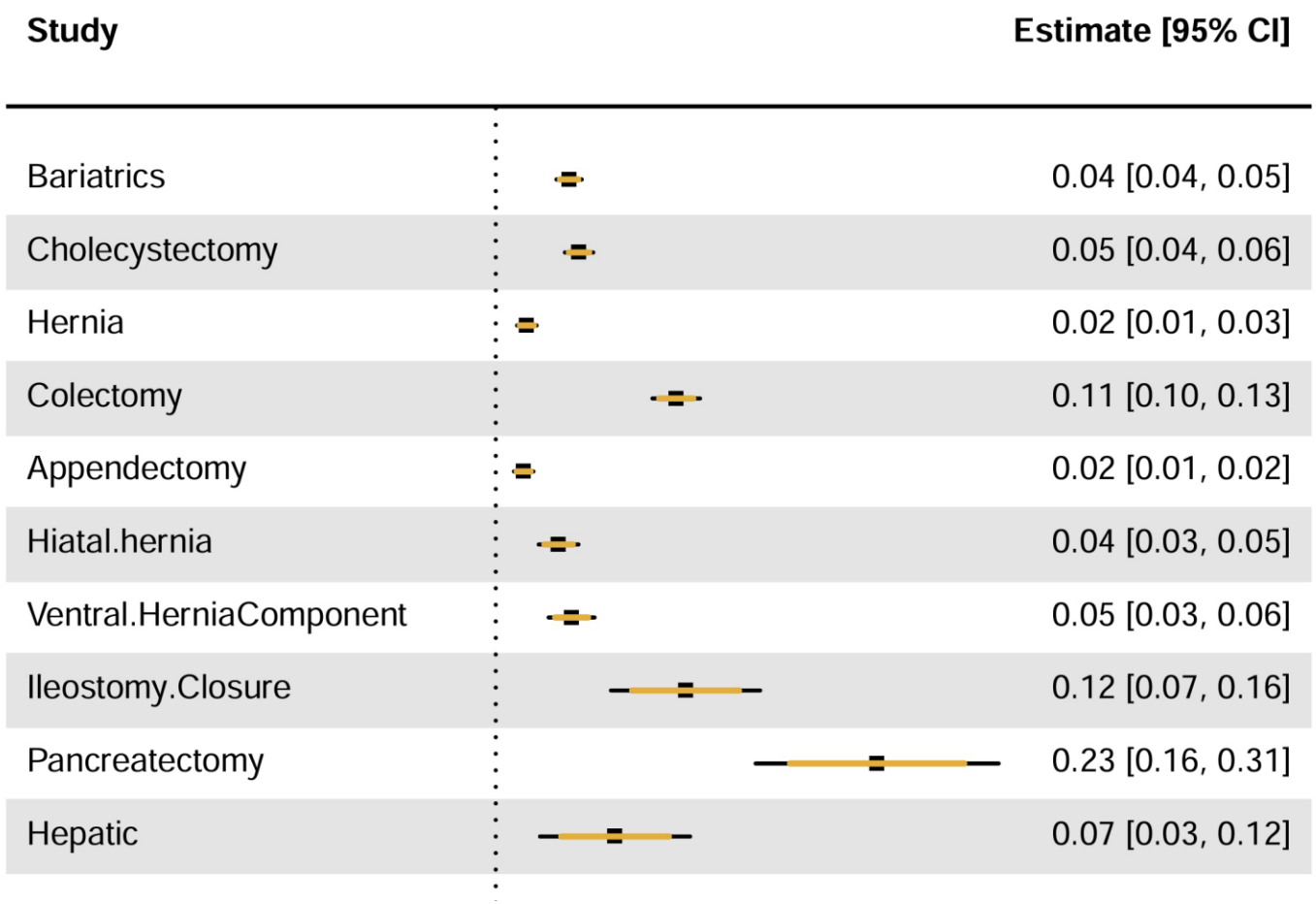
New Forest Plot (Method 1)



New Forest Plot (built-in functions)



Non meta-analysis example: Surgical complications



Conclusions

- With only 95% intervals, we can be misled by overlap/nonoverlap
- With only 84% intervals, we won't have intervals we want for individual studies
- With both in one combined plot, we get everything we need
- Easy to do with *metafor* package, using suggested options or choose lty, lwd, col

Limitations

- Assumption of equal variances/standard errors
- Goldstein and Healy have more nuanced technique for unequal variance case
- Nothing is perfect for unequal variance case (always approximate)
- Approximate (but conservative) post hoc multiple comparisons are possible