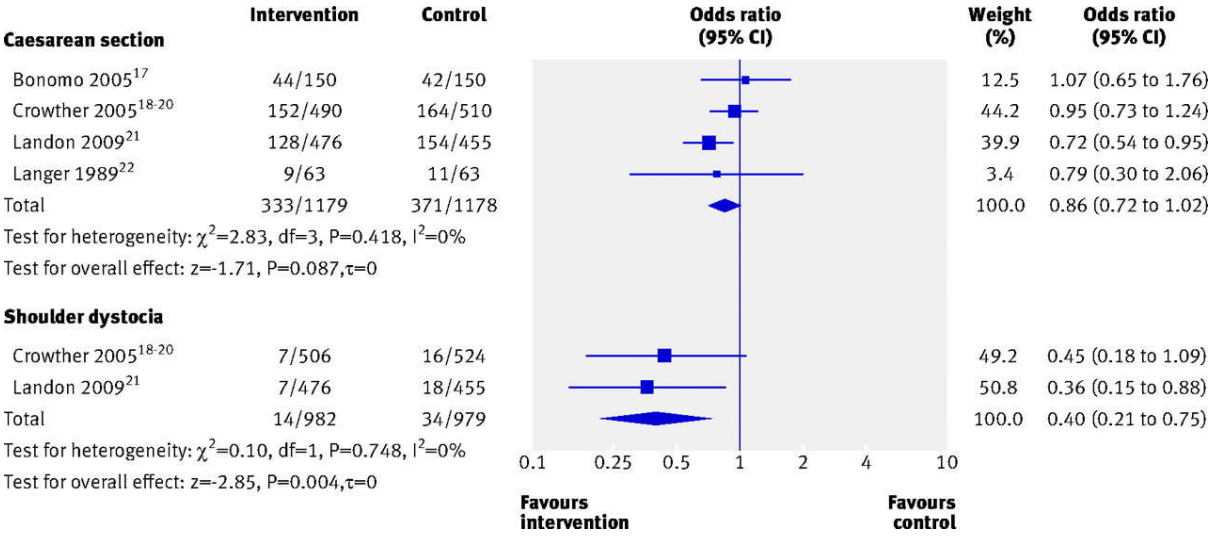
Specimen Question on Meta-analysis

This is the sort of question on meta-analysis that might be asked in Systematic Reviews module exam.

Question

Horvath *et al.* (*BMJ* 2010; **340**: c1395) carried out a systematic review of the effects of treatment in women with gestational diabetes mellitus. This included the following graph, which shows results for five trials comparing a specific treatment with usual care. In the trial by Bonomo et al., the treatment was by diet alone, in all other trials it was diet and insulin. Two outcomes are shown, Caesarean section and shoulder dystocia, an obstetric emergency which leads to difficulty in delivery. A random effects model was used.



What kind of graph is this and what do its elements represent?

Is there any evidence of heterogeneity between studies and is a random effects model the right thing to do here?

What conclusions could be drawn about the effects of intervention on Caesarean section and on dystocia?

Suggested points for a good answer

What kind of graph is this? A forest plot or a meta-analysis (accept either)

What do the elements represent? The squares represent the point estimates of the odds ratios and the horizontal lines represent their 95% confidence intervals. The diamond shapes represent the pooled or combined or meta-analysis estimate of the odds ratio (accept any). The widest point is the point estimate and the width is the 95% confidence interval.

Is there any evidence of heterogeneity between studies and is a random effects model the right thing to do here? The heterogeneity tests are not significant and the I^2 statistics are zero, so there is no evidence of heterogeneity. This would lead to a fixed effects model rather than a random effects model, but the authors may think a random effects model is better because the treatments vary.

Interpretation: We can conclude that there is weak evidence for a small effect on Caesarean section, insufficient to draw a firm conclusion, because the confidence interval just includes 1. We can conclude that there is good evidence for an effect on dystocia, though the size of the effect is not well estimated, because the confidence interval does not include 1.0 but is wide.

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15 February 2012