**PRACTICAL: Meta-analysis in Stata**

**BINARY DATA**

**Q1.1 - From a visual inspection of the forest plot generated by Stata, do the measures of outcome appear consistent across studies (just provide a qualitative/descriptive answer based on the data)?**

**ANSWER:** Not consistent, the RR ranged 0.11 (in Schechter) to 1.23 (in Feldstedt)

**Q1.2 - What is the summary estimate and 95% confidence interval?**

**ANSWER:** Pooled RR=1.01; 95% CI 0.95, 1.06

**Q1.3 - Which study is weighted the most heavily, and how does the point estimate for this study compare to the overall summary estimate?**

**ANSWER:** ISIS-4 (89.8%)

**Q1.4 - How would you interpret the results?**

**ANSWER:** There is no statistically significance difference in mortality rate between those treated with IV Mg and those not treated with IV Mg.

**Q1.5 - Do the summary estimate and 95% confidence interval differ from the fixed effects model?**

**ANSWER:**

**Fixed: 1.01 , 95% CI 0.95 to 1.06**

**Random: 0.51, 95% CI 0.35 to 0.74**

**Q1.6 - Compare the relative weights of the studies in the fixed effects model with their weights in the random effects model. Discuss how the relative weights affect the summary estimates and 95% confidence intervals.**

**ANSWER:**

**Fixed: 90%**

**Random: 16%**

**Q1.7 - Are the results homogeneous?**

**ANSWER:** No, there is statistically significant moderate (I2=67%, p<0.000)

[ low (0-40%), moderate (30-60%), substantial (50-90%), considerable (75-100%). Though depends on (i) magnitude and direction of effects and (ii) strength of evidence for heterogeneity (e.g. P value from the chi-squared test, or a confidence interval for I2)

**Q1.8 - What is heterogeneity and what factors can account for heterogeneity?**

**ANSWER:** the variation in study outcomes between studies: clinical, methodological or statistical

**Q1.9 - Which trial(s) do you suspect contributes the most to heterogeneity in this analysis? Why?**

**ANSWER:** ISI-4, sample size

**Q1.10 - Does exclusion of this trial(s) “fix” the heterogeneity?**

**ANSWER:** Yes

**Q1.11 - What are the summary estimates for each group?**

**ANSWER:**

Smaller-RCTs (RR=0.39,95% CI 0.29, 0.54)

Meta-RCTs (RR=1.04; 95% CI 0.98, 1.10)

**Q1.12 - Are the results homogeneous for each group?**

**ANSWER:**

Smaller-RCTs (Homog., I2=0%, p=.448)

Mega-RCTs (Heterog., I2=82%, p=.017)

**Q1.13 - Is the study size statistically significant?\***

**ANSWER:**

Yes, p = 0.002

**Q1.14 - What percentage of heterogeneity is explained by the study size\***

**ANSWER:**

The proportion of between-study variance explained by the covariates can be assessed via the R2 statistic. Here roughly **78%** of the between-study variance is explained by the covariate study size.

**Q1.15 - What do you conclude?**

**ANSWER:** It became evidence that IV Mg, was effective as of 1998

**Q1.16 - Does the funnel plot show evidence of publication bias?**

**ANSWER:** Yes, missing studies (right side)

**Q1.17 - Do the statistical tests suggest evidence of publication bias?**

**ANSWER:** yes, there is evidence of publication bias, p-value for small-study effects p = 0.000

**Q1.18 - Examine the graph. How many filled studies?**

**ANSWER:** meta trimfill reports that 7 hypothetical studies are estimated to be missing.

**Q1.19 - What are the new pooled RR estimates?**

**ANSWER:** When 7 studies are imputed and added to the meta-analysis, the treatment effect is no longer statistically significant after adding the hypothetical missing studies [(0.51 (0.35 to 0.74) versus 0.71 (95 0.48 to 1.04)]. This suggests that the treatment beneﬁt as reported in the literature may be smaller than it would be in the absence of publication bias.

From the funnel plot, almost all the imputed studies fall in the darkest-gray region corresponding to a p-value of more than 10%. This further supports the conclusion that the small-study effect is most likely because of publication bias.

**GENERIC DATA**

**Q2.1 - What are the summary estimates and 95% CI for both fixed and random-effects**

**ANSWER:**

Fixed: -1.01 (95% CI -1.24 to -0.79);

Random (-1.06 (95% CI -1.53 to -0.59)

**Q2.2 - Are the results homogenous?**

**ANSWER:** No, statistically significant substantial heterogeneity (I2 = 75%)

**Q2.3 - Which study level covariates are significant?**

**ANSWER:** Unadjusted (Abstract & duration)

Adjusted (Abstract)

**Q2.4 - What percentage of heterogeneity is explained for these covariates?**

**ANSWER:** Abstract & duration jointly explained 100% of the between study variance

**Q2.5 - Examine whether there is evidence of publication bias?**

**ANSWER:** No evidence of publication bias

**PREVALENCE DATA**

**Q4.1 - What is the commonest pre-morb condition?**

**ANSWER:**  Hypertension (16.37%, 95% CI 10.15 to 23.65) followed by cardiovascular disease (12.11%, 95% CI 4.4 to 22.7)

**Q4.2 - What is the least common pre-mord condition?**

**ANSWER:** COPD (0.95%, 95% CI 0.43 to 1.61) followed by malignancy (1.50%, 95% CI 0.58 to 2.73).

**Q4.3 - Is there is correlation between the prevalence estimates and % males**

**ANSWER:** No, not statistically significant

**Q4.4 - Are smaller studies tended to have reported over reported the prevalence estimates**

**ANSWER:** Yes, smaller studies tended to report higher prevalence estimates.