CPH 931— Fall 2008 — Dr. Charnigo

Written Assignment 5 Solutions

1a. The 95% confidence interval for the relative risk of 30-day mortality included 1, and the p-value attached to the point estimate was greater than 0.05, so the authors could not reject the null hypothesis of a relative risk equal to 1 (i.e., of equal risks with CAS and CEA).

1b. An unsophisticated reader would be vulnerable to the second misunderstanding, "When comparing two groups, a p-value greater than 0.05 means that there is no important difference between the groups." We could tell such a reader that the 0.57 would represent an important difference between the groups if it were real, but the problem is that we do not know whether the 0.57 is real. While 0.57 is the best single number guess for the relative risk, the data are not inconsistent with a relative risk of 1.

1c. The meta-analysis is negative because the confidence interval for the relative risk includes 1. Assuming an ambivalence point of, for example, 0.80 (i.e., 20% fewer deaths with CAS than with CEA), we classify the meta-analysis as inconclusive negative since the lower endpoint of the confidence interval is 0.22 — far less than 0.80. Some of the plausible values for the relative risk favor CAS, while others favor CEA.

Note: The classification of inconclusive negative remains unaltered with any other (reasonable) assumption about the ambivalence point.

1d. The authors used both a random-effects model and a fixed-effects model; both sets of results were presented in Table 2 on page 115. However, in their abstract the authors referenced only the results from the random-effects model. Four out of five point estimates were smaller with the fixed-effects model, although not dramatically so. All five confidence intervals were narrowed with the fixed-effects model, and two of the narrowed confidence intervals excluded 1.

1e. The p-values in Table 2 (accompanied by degrees of freedom 3, 3, 3, 4, and 3 respectively) translate to χ^2 statistics of 1.38, 7.06, 4.53, 8.34, and 3.92. The corresponding I^2 values are 0, 0.575 (or 57.5%), 0.338 (or 33.8%), 0.520 (or 52.0%), and 0.235 (or 23.5%).

1f. A funnel plot with four or five points is rarely informative; usually more points are needed to see a pattern that would either suggest publication bias or relieve our concerns about it.

Publication bias, when it does occur, tends to push the meta-analysis toward a positive conclusion. Thus, we would be more concerned about the possibility of publication bias if the conclusion of the meta-analysis were positive than if it were negative. The negative conclusion of this meta-analysis, along with the authors' thorough searches for relevant studies to include (MEDLINE, Embase, ISI Web of Knowledge, Current Contents, International Pharmaceutical Abstracts database, Cochrane Central Register of Controlled Trials; abstract lists from the 2005 and 2006 scientific meetings of the American Heart Association, the American College of Cardiology, the European Society of Cardiology, and the Transcatheter Cardiovascular Therapeutics), reduce our concerns about publication bias.

2. The moving average and kernel smoother reduce much of the day-to-day variability in the raw data, so that the temporal trend in SARS incidence is more clearly visible. This is especially useful from days 50 to 80, when we must distinguish the temporal trend from meaningless gyrations in the raw data. The curve produced by the kernel smoother is slightly less jagged than that produced by the moving average.