

Homework 7, BIOS 767

Spring, 2017

This is based on problem 14.1, the “toenail” problem from Homework 6.

1. Obtain descriptive statistics (which could be tabular and/or graphical). Comment.
2. Label the outcomes at visits 1 thru 7 for the i -th subject as y_{i1} to y_{i7} . The observations will be labelled by visit. Present the sample correlation matrix separately in each treatment group. Comment.
3. Present the observed log-odds ratios between visits separately in each group. Comment. [There are $7 \times 6/2 = 21$ odds ratios per group. They are computed from 2×2 tables.]
4. Based on the above, if you were to fit a marginal model and had to specify a model for the correlations, what sort of model would you choose?
5. Based on the above, if you were to fit a marginal model and had to specify a model for the pairwise log odds ratios, what sort of model would you choose?
6. You are designing a similar study but with only 4 monthly visits (baseline plus three post-baseline). You intend to fit a marginal model (as in problem 14.1.1), and based on prior data, reasonable parameter values are $\beta_1 = -0.6, \beta_2 = -0.15$, and you wish to test $H_0 : \beta_3 = 0$ against $H_1 : \beta_3 = -\log(1.5)$ with Type-I error 0.05 and power 0.8. Compute the required number of subjects (assuming complete data on all subjects). Use the correlation structure and parameter value(s) suggested by part (2) above.