

MATH 8850: Mid-term Project Outline

Bible

October 2, 2019

Seizure Data


The data we have been using as an example for Gaussian, Poisson and Negative Binomial models comes from a clinical trial conducted by Leppik *et al.* (1987). In their analysis of the data they concluded that progabide (the drug under study) did not significantly reduce risk of seizures in the group of individuals selected for treatment. This finding prompted Thall and Vail (1990), Breslow and Clayton (1993), Diggle *et al.* (2002) among others to use the *seizure* data as a case in point example for more refined modeling techniques.

The analytic file provided (seizure2.csv, uploaded onto canvas) contains records on 57 subjects in the seizure study (historically, analysis of this data has been conducted on a reduced number of subjects due to subjects with abnormally high/low seizure rates). The file contains 7 columns of data:

- Columns y1 - y4 contain the two week counts of observed seizures in the first through fourth (two week) followup periods after treatment assignment.
- trt corresponds to a 0/1 indicator corresponding to 0=placebo, 1=progabide assignment.
- base contains the 8 week baseline seizure count for each individual.
- age contains individuals age at enrollment in the study.

Scientific Questions

For our purposes there are three main scientific questions:

1. Do the individuals selected for progabide treatment differ in baseline seizure risk (*i.e.* rates) from those who were selected to participate in the placebo arm? 
2. For the individuals receiving placebo, does their expected seizure rate remain constant over the length of the study?
3. Do individuals receiving progabide demonstrate a reduction in the number of seizures they experience relative to their baseline values?

Guidelines and Expectations

Students will be expected to work in teams (team assignments are included in Table 1) to produce a video/digital poster. Each poster will be expected to contain four key components:

1. Concise description of the data (text).
2. Two visual summaries of the data (graphical).
3. Description of modeling strategy.
4. Conclusions w.r.t. the scientific questions (teams may opt to answer the questions using hypothesis testing or interval inference).

Blue Barracudas	Silver Snakes	Purple Parrots	Orange Iguanas
Maddy Thomas Aaron	Yaun Seyed Tianqi	Jingjing Feng Weimin	Brandon John Ebenezer

Table 1: Team assignments for mid-term project.

Teams will be expected to present their posters (describe the data, explain their analysis and present their results) in five minutes. Following each presentation a few minutes will be reserved for Q&A. All team members are expected to be able to answer any question regarding the analysis or results and questions will be directed to individual team members. So, make sure that all team members are familiar with what is being presented and the analysis that was conducted.

Timeline

We will meet in class to discuss the project on Thursday October 3rd and allow the teams to discuss how they want to proceed. Class on Tuesday October 8th will be reserved as dedicated time to work on the projects, we will not be having class in the traditional sense. If teams would prefer to meet outside of the classroom that is their prerogative, but the instructor will be present. Presentations will take place during class on Thursday October 10th. Prior to the start of class on the 10th, posters will be uploaded on a common computer so that we may transition from one presentation to the next seamlessly. Individuals who are late to class on the day of the presentations will be penalized 10% of their individual project grades.

- Leppik, I. E., et al. (1985). A double-blind crossover evaluation of progabide in partial seizures. *Neurology* 35, 285.
- Thall, P., Vail, S., Some Covariance Models for Longitudinal Count Data with Overdispersion. *Biometrics*, Vol. 46, No. 3 (Sep., 1990), pp. 657-671
- Breslow, N., Clayton D., Approximate Inference in Generalized Linear Mixed Models. *Journal of the American Statistical Association*, Vol. 88, No. 421 (Mar., 1993), pp.9-25
- Diggle et al. *Analysis of Longitudinal Data*. Oxford 2002