/\* Homework, 14 points \*/ /\* Given the significance level = 0.05 \*/

/\* (1) Please write down the GLM model. \*/

log(y) = log(2) + β0 + β1 \* bline + β2 \* trt + β3 \* age

→ log(y) = log(2) - 0.1368 + 0.0228 \* bline - 0.1472 \* trt + 0.0227 \* age

y：每兩周發生癲癇的次數

bline：前 8 周發生癲癇的次數

trt：治療組別

/\* GLM model \*/

**proc** **genmod** data=new;

class id;

model y=bline trt age / d=poisson offset=ltime;

**run**;

/\* (2) Please write down the assumed probability mass function (p.m.f. in GLM) for the response variable. \*/

Y ~ Poisson(λ)

/\* (3) According to the deviance statistic, is the GLM model fitted well? \*/

Deviance = [ logLik(β̂saturated) − logLik(β̂current) ]

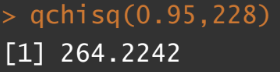


在此 Deviance=946.1473

H0: current model 和 saturated model 無異

H1: current model和 saturated model 有異

藉由 R 軟體計算



顯著水準 0.05 下，自由度為 228 的卡方分布臨界值為χ20.95,228 = 264.2242

在此 Deviance=946.1473>264.2242，Reject H0，the model is not fitted well。

/\* (4) According to the GLM model, can progabide reduce seizure rate? \*/



GLM model可以發現 progabide(治療組)有 reduce seizure rate，p-value = 0.006 達顯著，且係數為-0.1472，表示有服藥者平均一周癲癇發作次數是未服藥者的exp(−0.1472) = 0.86倍。

/\* (5) Please write down the quasi-likelihood (GEE) for the response variable. \*/

Y ~ Poisson()

/\* (6) According to the GEE model, can progabide reduce seizure rate? \*/



雖然 trt 的係數一樣為-0.1472，但p-value=0.4134未達顯著，故沒有證據說 progabide can reduce seizure rate。

/\* GEE model \*/

**proc** **genmod** data=new;

class id;

model y=bline trt age / dist=poisson offset=ltime;

repeated subject=id / type=exch corrw covb;

**run**;

/\* (7) Which model (GLM or GEE) will you choose? Why? \*/

GEE model，已由第(3)題得知GLM model配適的不佳，考量到每筆資料不同 id 間每次visit得到的癲癇次數會有相關性，屬重複測量資料，故使用 GEE 方法可行性較高。