

Epidemiology III: BMTRY 748

Homework 1: Due date: Jan 25, 2018

Provide succinct summary and only relevant SAS output and SAS code as part of your answer to each question. Type your answers unless it requires lengthy hand derivation.

Due date: 1PM, Jan 25, 2018 (send gebregz@musc.edu and stevensd@musc.edu)

Please include your last name in the file name that you send via e-mail.

1. The data below comes from a study of lung function in Cystic Fibrosis patients. It included 200 patients (102 males and 98 females) and measurements on FEV1 (forced expiratory volume in one second) were given at five time points. Data on age of the patient on each visit, gender, mutation of the F508 genotype (1=homozygous, 0=non-homozygous) status of patients were recorded. The goals of the study were (1) to determine if the rate of decline in FEV1 varies by gender and f508 status (1=homozygous, 0=non-homozygous (heterozygous or no mutation)).
 - a. Convert the data from vertical (long or univariate) to horizontal (short or multivariate)
 - b. Summarize the mean FEV1 by visit separately for groups based on gender
 - c. Find the sample covariance and sample correlation matrix for each gender
 - d. Find the pooled sample covariance matrix and corresponding estimated correlation matrix under the assumption of a common covariance matrix for males and females
 - e. Provide matrix plot of FEV1 responses and summarize your observations
 - f. Provide profile plot of FEV1 responses by gender and summarize your observations
 - g. Provide mean plot of FEV1 by gender and summarize your observations
 - h. Based on inspection of the results in (c, d) and (f), do you think the assumption of a common covariance matrix for each gender is reasonable? Why or why not?
 - i. Does the assumption of sphericity hold? Use the Mauchly's criterion for the orthogonal components (in SAS Proc GLM output). If not provide the HF and GG adjusted p-values
 - j. Are males and females different with their FEV1 levels overtime? Test this hypothesis under the assumption of
 - a. sphericity

source	df	F	p-value
Female			
Visit			
Female*visit			
error(visit)			
Error			

- a. sphericity
 - b. adjusted for sphericity .

source	df	F	p-value
Female			
Visit			
Female*visit			
error(visit)			
Error			