
Computational Statistics

Report 2 – 1st Semester 2022/2023

Deadline: 12/01/2023

This study contains the data from the Mayo Clinic trial in primary biliary cirrhosis (PBC) of the liver conducted between 1974 and 1984. A description of the clinical background for the trial and more extended discussion can be found in Dickson et al. (1989) and Markus et al. (1989).

A total of 424 PBC patients, referred to Mayo Clinic during that ten-year interval, met eligibility criteria for the randomized placebo controlled trial of the drug D-penicillamine. The first 312 cases in the data set participated in the randomized trial and contain largely complete data. Missing data items are denoted by ‘.’. A description of the variables recorded is below:

Variable name	Description
ID	Case number
Days	Number of days between registration and the earlier of death, transplantation, or study analysis time in July, 1986
Status	0=censored, 1=censored due to liver tx, 2=death
Drug	1= D-penicillamine, 2=placebo
Age	in days.
Sex	0=male, 1=female
Asictes	Presence of asictes: 0=no 1=yes
Hepatomegaly	Presence of hepatomegaly: 0=no 1=yes
Spiders	Presence of spiders: 0=no 1=yes
Edema	Presence of edema: 0=no edema and no diuretic therapy for edema; .5 = edema present without diuretics, or edema resolved by diuretics; 1 = edema despite diuretic therapy
Bilirubin	Serum bilirubin in mg/dl
Cholesterol	Serum cholesterol in mg/dl
Albumin	in gm/dl
Urine	Urine copper in ug/day
Alkaline	Alkaline phosphatase in U/liter
SGOT	in U/ml
Triglycerides	in mg/dl
Platelets	per cubic ml / 1000
Prothrombin	Prothrombin time in seconds
Stage	Histologic stage of disease

Perform a thorough statistical analysis of the data, in particular using MCMC methods to select a suitable (Weibull) survival model and interpret the associated results concerning the after-transplantation lifetime study.

References: Dickson ER, Grambsch PM, Fleming TR, Fisher LD, Langworthy A (1989). Prognosis in primary biliary cirrhosis: model for decision making. *Hepatology*, 10(1), 1-7. Fleming TR, Harrington DP (1991). *Counting Processes and Survival Analysis*, Wiley. Markus BH et al. (1989). Efficacy of liver transplantation in patients with primary biliary cirrhosis. *New English Journal of Medicine*, 320, 1709-13.