Mini-course on Survival Analysis

Survival analysis describes the various methods for modelling the times from an initiating event to some terminal event. Survival analysis is prominentlyy used in the biomedical sciences, but they are also used in many other fields such as the social sciences, engineering and economics.

A special feature of survival data is the presence of incomplete observations. Among other reasons, this may occur because the event of interest is not observed before the end of the study or because the subject leaves the study before an event occurs. This phenomenon is called censoring and it requires special statistical methods.

This course introduces general statistical concepts and methods for the analysis of failure time data. Different types of censored data will be introduced and techniques for estimating the survival function will be illustrated. The use of the log-rank test as a technique for testing equality of survival functions is also discussed. Finally, regression models based on the Cox proportional hazards model will also be studied. The course requires participants to use the R statistical package to analyze survival analysis data.

Aims

- To provide an introduction to survival analysis;
- To illustrate how the methods can be implemented using R, a free software environment for statistical computing and graphics.

Contents

- An overview of survival analysis methods
- Censoring
- Survival and hazard functions
- Estimation of the survival function: Kaplan-Meier
- The Log Rank test
- Introduction to the Cox Proportional Hazards (PH) model
- The Cox model with time-dependent covariates