Biostatistics (61202)

Instructors: X.PEDELI

Core Course, 2nd semester, 4 ECTS units
Course level: Graduate (MSc)
Language: English

Course Description

Introduction to epidemiology and epidemiological study designs. Measures of health and disease: Measures of disease frequency (prevalence, incidence), Risk measures (cumulative incidence or risk of disease, incidence rate of disease, odds of disease), Measures of exposure effect (risk ratio, rate ratio, odds ratio, risk difference, rate difference). Cohort studies: Rates, Rate ratio, Test of null hypothesis, Exposures with more than two levels, Stratified analysis of rates – Controlling for confounders. Survival analysis: Censored observations, The lifetable method, The Kaplan-Meier method, The log-rank and other tests for testing survival curves, The Nelson Aalen estimator, Survival regression (Cox's proportional hazard model, Aalen's additive model, Cox's time varying proportional hazard model). Case-control studies: Analysis of case-control studies (prospective/ retrospective approach), Analysis of unmatched case-control studies, Matched case-control studies, Choice of controls in case-control studies.

Prerequisites

Students should have basic knowledge of probability theory and statistics. For the programming assignments of the course, programming experience in R is required.

Target Learning Outcomes

After successfully completing the course, students will be able to:

- recognize the appropriate study design in a medical study, and
- use appropriate measures and statistical methods to help the health scientist in deriving sensible conclusions.

Recommended Bibliography

- Armitage, P.; Berry, G.; Matthews, J.N.S. Statistical Methods in Medical Research; Wiley: Hoboken, NJ, USA, 2002.
- Clayton, D.; Hills, M. Statistical Models in Epidemiology; Oxford University Press: Oxford, UK, 2013.
- Pocock SJ. Clinical trials: a practical approach. Wiley, New York, 2013.
- David W. Hosmer, Jr., Stanley Lemeshow, Susanne May, 2008 Applied Survival Analysis: Regression Modeling of Time to Event Data, 2nd Edition. Wiley Series in Probability and Statistics
- Kenneth J. Rothman, Sander Greenland, Timothy L. Lash, 2012 Modern Epidemiology Third Edition, Lippincott Williams & Wilkins

Teaching and Learning Activities

One three-hour lecture per week, assignment as homework (to be submitted).

Assessment and Grading Methods

The final grade is the weighted average of the final examination grade (80%) and the grade of the assignment to be submitted (20%).