SYLLABUS DEL CORSO

Clinical Research

2324-4-H4102D059-H4102D198M

Aims

The course aims to explore theoretical and practical aspects of the statistical analysis of clinical data with a particular focus on the application of causal inference methods to observational studies with survival outcomes.
The student will learn:

- the main tools to describe survival outcomes
- the basic methods to assess the association between an exposure and a survival outcome
- the basic concepts in causal inference
- the standard causal inference methods to assess the marginal treatment effect in observational studies (with focus on survival outcomes)

Contents

The course will review basic concepts in survival analysis, main quantities of interest and non-parametric estimators, Cox regression model.
Furthermore, an introduction to causal inference methods to assess the association between an exposure and a survival outcome in observational studies will be provided.
Real examples will be considered and practical guidance on the application of the methods will be provided.
Analysis with R software will be shown to demostrate the application of the methods.

Detailed program

Introduction

Recap on basic concepts in statistics (study designs, desccriptive methods, statistical inference, regression methods).

Review of survival analysis

Basic theory in survival analysis: complexities of life time data, survival/incidence functions, rate, hazard function, Kaplan Meier estimator, epidemiological rate (exponential) estimator, Cox regression model.

Introduction to causal inference

Basic concepts in causal inference: counfounders bias, effect modification, Direct Acyclic Graphs (DAGs), Average Treatment Effect (ATE)

Causal inference methods: Propensity Score (PS), PS-matching, PS-weighting (Inverse Probability Weighting IPW)

Additional content (not mandatory)

R commands to apply causal inference methods for the estimation of a marginal treatment effect on real data with survival outcome

Prerequisites

- Basic descriptive and inferential statistics.

Teaching form

Lectures and R labs in presence.

Textbook and teaching resource

Course slides, datasets and R lab commands and outputs will be available on the elearning page.

Semester

Second semester

Assessment method

Written exam

Office hours

Upon request by email, in the Webex room of the teacher.

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING