UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Medical Statistic II

2425-5-H4601D070-H4601D092M

Aims

This course aims to provide the basic tools of medical statistics that are at the basis of a proper methodological approach to a research project. Students will be able to: - illustrate the problem of uncertainty and the basic concepts probability evaluate the accuracy of a diagnostic test and its optimal use in the clinical practice - define a random variable and describe the main properties of discrete and continous distributions and calculate probabilities- discuss methods of statistical inference: the problem of point and interval estimation - discuss methods of statistical inference: the problem of hypothesis testing – to critically read a clinical paper.

Contents

Uncertainty in medicine. Probability and Random Variables. Evaluation of a diagnostic process. Statistical inference: point estimation and sampling distribution, confidence interval and hypothesis testing. Evaluation of results from a clinical study.

Detailed program

RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS: Definitions of probability Concept of conditional probability and independence; Probability of the union and intersection of events; Discrete and continuous random variables; The Binomial and Poisson distribution - The Normal distribution
DIAGNOSTIC PROCESS EVALUATION: Sensitivity and specificity of a diagnostic test; Predictive values of a diagnostic test (Bayes theorem); ROC curve
INFERENCE Population and sample; Population parameter and Sample Estimates; Sampling distributions of estimators and standard error; Confidence intervals - The logic of hypothesis testing: type I and II errors, p-value; One and two-samples tests for means and proportions; Confidence intervals and hypothesis testing: statistical vs

clinical significance -
EVALUATION OF RESULTS IN A CLINICAL STUDY: observational and experimental studies; sample size calculation; Measures of effect for binary and time to event variables; the problem of multiple testing; basic concepts of regression models

Prerequisites

Elementary notions of statistics

Teaching form

Lectures and practicals

Textbook and teaching resource

M.Pagano & K.Gauvreau. Biostatistica (II edizione italiana). ed. Idelson Gnocchi, Napoli 2003.

Bland Martin, Statistica Medica, APOGEO, 2019

Bossi A., Cortinovis I., Statistica medica. Esercitazioni, Città Studi Edizione, 1996

Semester

First semester

Assessment method

Written with exercises, tests and open questions

Office hours

On demand

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | PARTNERSHIPS FOR THE GOALS