UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Medical Statistic I

2425-1-H4601D069-H4601D091M

Aims

Students should be able to: - explain the basic concepts of statistics: variables and data, statistical units and population - describe and use the main indices of location and variability - apply the principles related to the process of data collection and to the use of data-bases - build appropriate tabular and graphical representations of data - explain the process of measurement in biology and medicine - discuss the different types of error as related to any measurement process and the use of the index of precision and accuracy - illustrate the problem of uncertainty and the basic concepts probability evaluate the validity 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 - discuss methods of statistical inference: the problem of point and interval estimation - discuss methods of statistical inference: the problem of hypothesis testing - evaluate the relationship between two quantitative variables: the Pearson correlation coefficient and the simple linear regression model. -use the software R for the description and analysis of data

Contents

Detailed program

Statistical units, sample, population, variables and data - Types of variables - Indices of location and dispersion - Methods for data collection, coding and checking Design of research data-bases - Construction of tables and graphs Concept of random and systematic errors as related to any measurement process - The indices of precision and accuracy - Definitions of probability - Concept of conditional probability and independence - Probability of the union and intersection of events. - Sensitivity and specificity of a diagnostic test - Predictive values of a diagnostic test (Bayes theorem) Discrete and continuous random variables - The Binomial and Poisson distribution - The Normal distribution - Sample Estimates versus Population Measures - Sampling distributions of estimators - 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 - The relation between two quantitative variables - Correlation and simple linear regression - measures of effects for binary and time to event outcomes

Prerequisites

Elementary notions of mathematics

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