



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Statistica Medica II

2223-5-H4601D070-H4601D092M

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#### 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 continuous 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**

No one

## **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

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