



Department of Biomedical Sciences
Physiotherapy Degree Programme
Statistics Syllabus

Academic year 2020-2021. Academic term: first and second semester of the first year.
Course coordinator: Dr Emanuela Morenghi

MEDICAL STATISTICS AND EPIDEMIOLOGY (6 ECTS)

Dr Emanuela Morenghi	Degree in Mathematics from the University of Milan. PhD in Medical Statistics at the University of Milan Adjunct professor at Humanitas University since 2016 Biostatistician at Istituto Clinico Humanitas. E-mail: emanuela.morenghi@humanitas.it
Objectives	The biostatistics and epidemiology module aims to enable the student to critically read a scientific article, and to provide data analysis tools for research.
Teaching methods	Lectures with classroom discussion. The course material will be available on the Hunimed LMS website. Following each theoretical topic there will be practical exercises, including the use of Excel.
Teaching material	Lecture slides M. Bland “Statistica Medica” Apogeo Editore. http://www.quadernodiepidemiologia.it/epi/HomePage.html
Content	
<ol style="list-style-type: none">1. Definition of sample, and concept of biological variability.2. Clinical trials Introduction to the ethical issues of clinical trials, their phases, and the concept of randomisation Confounding factors: what they are and how to control them Sample size: What is it used for?3. Epidemiological studies To be able to differentiate between the characteristics of the main observational epidemiological studies, and to be able to evaluate their advantages and disadvantages. Concept of internal validity and reproducibility of a study Difference between Odds and risk, and difference between prevalence and incidence.4. Meta-analysis After a brief introduction in the first semester, the second semester will focus on the concept of heterogeneity and how to control it5. The diagnostic test Definitions of probability and conditional probability. Definition of sensitivity and specificity, NPV and PPV, and likelihood ratio6. Descriptive statistics Definition of variable and discrete frequency distribution Main graphical representations of data Measures of central tendency and variability, with a first approach to Excel for their calculation	

<p>7. The Gaussian distribution</p> <p>8. Statistical tests characteristics of a statistical test definition Type I and Type II errors, and sample size definition of p-value</p> <p>9. CLT e CI Central limit theorem and the difference between standard deviation and standard error confidence intervals: what they are, how to use them</p> <p>10. Some statistical tests Student-t-test. Chi-squared test. ANOVA: one-way and for repeated measures Linear, simple and multiple regression to control confounding factors Non-parametric tests: Mann Whitney, Wilcoxon, Kruskal Wallis, Friedman</p> <p>11. Overview of survival analysis: how to construct the Kaplan Meier curve</p>

METHODOLOGY IN KEEPING UP-TO-DATE WITH SCIENCE (1 ECTS)	
PT Valeria Vella	Physiotherapist at the Physiotherapy Service of Humanitas Hospital, expert in physiotherapy in the neurorehabilitation field. E-mail: valeria.vella@humanitas.it
Dr Silvia Marra	Librarian at the Scientific Documentation Centre of the Humanitas Hospital E-mail: silvia.marra@humanitas.it
Objectives	Know the characteristics and contents of digital resources useful for study and research activities. Set up and carry out a documentary research through targeted strategies on bibliographic research databases and to retrieve information and documents using an evidence-based perspective. Know and learn how to use tools to organise a bibliography.
Teaching methods	Lectures supported by slides and practical computer exercises
Teaching material	Slides presented during the lecture, available for physiotherapy students on LMS Diodoro D, Descoich C, Iovine R, Tosetti C, Rispondere a un quesito clinico, Il Pensiero Scientifico Editore Bassi C, Pubmed Istruzioni per l'uso, Il Pensiero Scientifico Editore
Content	
<p>1) Presentation of the course: purpose and method. Digital resources for research. The course: purpose and method. Medicine on the web. Digital resources: what they are and what they are used for. Evidence-based medicine. Literature classification and the pyramid of evidence. Documentary research. Research tools: databases and search engines. The main citation indicators. Why are we interested in citations?</p> <p>2) Research design. Pubmed: structure and main features. Search Design: background & foreground questions, Pico, keywords, Boolean operators and</p>	

special characters.

PubMed: structure and main features, how to use it, search strategies: free-word search or using index terms.

Thesaurus. PubMed: MeSH

3) Using Pubmed. Source retrieval.

PubMed: simple and advanced search functions, managing results, My NCBI. How to read and write a bibliographic citation.

Retrieving sources: searching and downloading a full text from PubMed, the Document Delivery services, searching and downloading a full text from the Humanitas OPAC.

4) Resources for clinical practice and bibliographic managers

PEDro: structure and main features, how to use it.

Cochrane Library and UpToDate: structure and main features.

How to manage information: bibliography managers

5) Practical application on clinical cases

Design and development of a literature search on PubMed based on clinical questions proposed by the lecturer.

Analysis and oral presentation of an article selected from the literature search.

Examination for the Statistics course. Written examination with both statistics exercises and multiple-choice questions on how to keep up to date with science. Oral examination of statistics for those who pass the written part and presentation of a bibliographical research carried out by consulting the main biomedical databases regarding a clinical question posed by the lecturer. (Chairman of the Examination Committee: Dr Manuela Morenghi)