

Master in Clinical Epidemiology, 2018/19

Quantitative methods are essential to conduct efficient and valid research in clinical settings. Their rapid development and increasing complexity make formal training of medical researchers involved in study design and analysis a priority. Clinical epidemiology aims at applying quantitative methods to translational medicine, to the study of clinically relevant research hypotheses and to the improvement of patient care.

The master in clinical epidemiology involves a renowned national and international faculty and is structured in 7 modules. Each module comprises a combination of lectures and computer practical. The statistical package Stata is used throughout. Case studies and literature examples will be used extensively to give students an appreciation for the application of epidemiologic principles to clinical settings. Each student will work on a project under the supervision of a tutor. These projects will be presented and discussed with all the students and the faculty at the end of the 1-year course.

MODULE 1: Introduction to epidemiological and biostatistical methods I

Rozzano, November 2018

This module provides an introduction to the master and an introduction to clinical epidemiology and biostatistical methods. The epidemiological part covers basic concepts of clinical epidemiology including development of research questions, measure of disease frequency and conduction of good research in clinical settings. The introduction to biostatistics focuses on descriptive statistics, normal distribution and standard statistical test (e.g. t-Student test, chi-squared test). Theoretical sessions are followed by more applied sessions using the software Stata that is introduced during this module.

MODULE 2: Introduction to epidemiological and biostatistical methods II

Rozzano, December 2018

The epidemiological part of this module covers basic principles of clinical epidemiology including measures of association, options in study design, definition of bias, confounding and effect modification. The biostatistics part focuses on statistical inference: confidence intervals, statistical tests and introduction to linear regression.

MODULE 3: Observational studies in clinical epidemiology

Rozzano, January 2019

This module familiarizes students with use and analyze of observational studies in clinical epidemiology. The following topics are addressed: natural history of disease, design of case-control and cohort studies, application of these studies to conduct etiological research in clinical epidemiology and address issues of safety and short- and long-term side effects, and introduction to directed acyclic graphs (DAGs). These epidemiological sessions are followed by two days focused on generalized linear models.

MODULE 4: Randomized clinical trials and survival analysis

Rozzano February 2019

This module is designed to introduce students to the theory, practice and analysis of intervention studies, including randomized controlled trials, non-randomized interventions and community interventions. Based on a range of examples students learn how to critically interpret and generalize results obtained from these studies. This module also focuses on survival analysis, including non-parametric methods, regression methods and more advanced issues, such as competing-risks.

MODULE 5: Diagnostic and prognostic studies

Rozzano, March 2019

The module covers theory, methods and practice of diagnostic and prognostic research. It covers basic and more advanced concepts, including sensitivity, specificity, likelihood ratios, ROC curves, discrimination, calibration, net reclassification. It discusses options in study design and potential sources of bias. Finally, it focuses on modelling, validation and case-studies.

MODULE 6: Prediction model summary practical and analysis of missing data

Rozzano, April 2019

The module covers the topics of the previous one mainly from a practical perspective, with a long computer summary practical focused on clinical prediction models. Students will be asked to work in small groups and then report on their analyses. This module also focuses on analyses of missing data.

MODULE 7: Causal inference summary practical

Rozzano, May 2019

The last module focuses on causal inference both from a theoretical and a practical perspective. Students will be asked to work in small groups on a real dataset with a long summary computer practical, and then report on their analyses. The final day of the master includes the issue of the reproducibility of clinical findings and a final discussion.

THESIS DEFENSE

Rozzano, October 2019

FACULTY

Olof Akre

Department of Medicine Solna, Karolinska Institutet, Stockholm, Sweden

Michela Baccini

Department of Statistics, Computer Science, Applications – “G. Parenti”, University of Florence, Italy

Rino Bellocco

*Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden;
Department of Statistics and Quantitative Methods, University of Milano-Bicocca, Italy*

Annibale Biggeri

Department of Statistics, Computer Science, Applications – “G. Parenti”, University of Florence, Italy

Paolo Bruzzi

Unit of clinical epidemiology, National Cancer Research Institute, Genoa, Italy

Dolores Catelan

Department of Statistics, Computer Science, Applications – “G. Parenti”, University of Florence, Italy

Giovannino Ciccone

AOU “Città della Salute e della Scienza di Torino”, Turin, Italy

Isabel dos Santos Silva

Department of Non-communicable Disease Epidemiology, London School of Hygiene & Tropical Medicine, UK

Andrea Evangelista

AOU “Città della Salute e della Scienza di Torino”, Turin, Italy

Milena Maule

Department of Medical Sciences, University of Turin, Italy

Franco Merletti

Department of Medical Sciences, University of Turin, Italy

Andreas Pettersson

Department of Medicine Solna, Karolinska Institutet, Stockholm, Sweden

Emanuele Pivetta

Department of Medical Sciences, University of Turin, Italy

Costanza Pizzi

Department of Medical Sciences, University of Turin, Italy

Elio Riboli

Humanitas University, Rozzano, Italy

Lorenzo Richiardi

Department of Medical Sciences, University of Turin, Italy

Daniela Zugna

Department of Medical Sciences, University of Turin, Italy