The course on "Causal Inference in Epidemiology and applications to Environmental Health" is jointly organized by the Department of Epidemiology of the Lazio Region Health Service, the Italian Epidemiological Association and the "Sapienza" University of Rome.

FACULTY

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Cost: a fee of 250 Euro to the Italian Epidemiological Association is due for the course and covers material and lunch.

Registration form: should be sent to Patrizia Compagnucci (p.compagnucci@deplazio.it) by July 3rd, 2015.
Applications will be accepted in chronological order subject to availability on a first come first admitted basis.

AVAILABLE PLACES: 30
A confirmation e-mail will be sent.

CAUSAL INFERENCE IN EPIDEMIOLOGY AND APPLICATIONS TO ENVIRONMENTAL HEALTH

ROME, 13 - 17 JULY 2015

Aula Montalenti, Dipartimento di Biologia e Biotecnologie
Charles Darwin (BBCD), Edificio "Genetica"

La Sapienza Università di Roma
Viale Regina Elena, 295 - Roma

A central issue in epidemiology is the evaluation of the causal nature of reported associations between exposure to defined risk factors or treatments and the occurrence of disease. This issue is even more important in environmental health sciences, where most of the research is observational in nature and the ability of the investigator to control exposure assignment is limited or non-existent. Nonetheless, besides contributing to the understanding of disease causation, etiologic studies are commonly regarded as providing the scientific basis for the adoption of preventive actions. Therefore, it becomes necessary a clear definition of what is meant by "causal relationship", how to properly design an epidemiological study to detect causal effects, and under which conditions and assumptions such an approach is feasible.

The course will introduce the concept of causal inference within the framework of experimental designs. Then, observational studies will be introduced and special emphasis will be devoted on the assumptions needed to estimate causal relationships. Different approaches will be presented, such as propensity score, inverse probability weighting and irregular assignment mechanisms. Mediation analysis will be introduced, and operative methods to decompose causal effects into direct, indirect, mediated and interactive effects will be presented.

Lectures will be held by researchers of the Universities of Turin, Florence and the Harvard School of Public Health. All lectures will be followed by afternoon sessions, led by Prof. Joel Schwartz, where case-studies will be presented and discussed. Finally, individual case-studies from students will be selected for discussion on the last day.

Classes are aimed to graduate students with limited experience in the causal inference framework and basic knowledge of epidemiology and statistics. Epidemiologists, biologists, statisticians, mathematicians and public health scientists and operators are eligible to attend.

PROGRAM

Monday 13 (11.00-13.00, 14.00-17.00)
Introduction and experimental designs
- Welcome/Introduction *(R. Pirastu, M. Stafoggia)*
- Morning. Causal Inference: Introduction (Assignment mechanisms) *(F. Mealli)*
- Afternoon. Analysis of experimental designs (Neyman, Fisher, model-based approach) *(F. Mealli)*

Tuesday 14 (9.30-13.00, 14.00-17.00)
Observational studies
- Morning, 1. Exchangeability, counterfactuals *(A. Biggeri, L. Richiardi)*
- Morning, 2. Propensity score: Design and Analysis *(A. Biggeri, L. Richiardi)*
- Morning, 3. Propensity score: Applications *(A. Biggeri, M. Baccini)*
- Afternoon, 1: Intro to DAGs *(C. Pizzi)*
- Afternoon, 2: Propensity score/IPW: a case-study *(J. Schwartz)*

Wednesday 15 (9.30-13.00, 14.00-17.00)
Irregular assignment mechanisms
- Morning, 1: Principal Stratification and Instrumental Variables *(M. Baccini, L. Forastiere)*
- Morning, 2: Regression Discontinuity Design *(F. Mealli)*
- Afternoon, 1: Difference-in-differences *(J. Schwartz)*
- Afternoon, 2: IV case study *(J. Schwartz)*

Thursday 16 (9.30-13.00, 14.00-17.00)
Mediation Analysis
- Morning. Mediation and interaction analysis: theory and examples *(D. Zugna, L. Richiardi)*
- Afternoon, 1. Direct/indirect effects, mediation/interaction: a case-study *(J. Schwartz)*
- Afternoon, 2. Applications of Principal Stratification *(M. Baccini, L. Forastiere)*

Friday 17 (9.30-13.00)
Case-studies and discussion
- Morning, 1. Individual case studies from students (all faculty)
- Morning, 2. General discussion