Swiss Epidemiology Winter School 2016

# Statistical Analysis with Missing Data Using Multiple Imputation and Inverse Probability Weighting

January 18 - 20, 2016

## Course description

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| **Faculty** | **Prof. James Carpenter, PhD (course co-ordinator)**<br>London School of Hygiene and Tropical Medicine, University of London, UK<br>and Medical Research Council Clinical Trials Unit, Kingsway, London, UK<br>**Prof. Marcel Zwahlen, PhD**<br>Institute of Social and Preventive Medicine (ISPM), University of Bern, Switzerland |
| **Place** | **CH – 3823 Wengen \| SWITZERLAND**<br>Hotel Jungfraublick (see map on http://www.epi-winterschool.org/hotels) |
| **Introduction** | Missing data are ubiquitous in observational and experimental research. They lead to a loss of statistical power, but more importantly, may introduce bias into the analysis. In this course we adopt a principled approach to handling missing data, in which the first step is a careful consideration of suitable assumptions regarding the missing data for a given study and analysis. Based on this, appropriate statistical methods can be identified that are valid under the chosen assumptions. The course will focus particularly on the practical use of multiple imputation (MI) to handle missing data in realistic epidemiological and clinical trial settings, but will also include an introduction to inverse probability weighting methods and new developments that combine these with MI.<br>This course is aimed at epidemiologists, biostatisticians and other health researchers with quantitative skills and some experience in statistical analysis. Stata® will be used for the computer practical sessions, and so familiarity with the package is desirable, although code and solutions will be provided. |

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| **Course objectives** | • To provide an introduction to the issues raised by missing data, and the associated statistical jargon (missing completely at random, missing at random, missing not at random)<br>• To illustrate the shortcomings of ad-hoc methods for 'handling' missing data<br>• To introduce multiple imputation for statistical analysis with missing data<br>• To compare and contrast this with other methods, in particular inverse probability weighting and doubly robust methods, and<br>• To introduce accessible methods for exploring the sensitivity of inference to the missing at random assumption<br>Through computer practical sessions using Stata®, participants will learn how to apply the statistical methods introduced in the course to realistic datasets. |
| **What you have to bring** | Students will bring their own portable computers. A course license of Stata® will be available, to be installed before arrival (or by University of Bern IT staff on arrival). |
| **Outline of course** | The course will run over three days and consist of lectures, group work and computer practical sessions. We start early in the morning with a review of the previous day. During the extended break in the afternoon participants review course materials, catch up on emails or go skiing. We reconvene at 5 pm for the computer sessions.<br>***Monday, January 18th (8:30 – 12:00 \| 17:00 – 19:00)***<br>***Tuesday, January 19th (8:30 – 12:00 \| 17:00 – 19:00)***<br>***Wednesday, January 20th (8:30 – 12:00 \| 17:00 – 19:00)*** |
| **Credit** | 1.5 ECTS |
| **Course book** | Carpenter, J. R. and Kenward M. G. (2013) *Multiple Imputation and its Application*, Chichester: Wiley. |
| **Maximum number of participants** | The maximum number of participants on this course will be 25. |
| **Course fee** | Academic: CHF 950<br>Industry: CHF 1900 |
| **Registration** | Registration on the Winter School website www.epi-winterschool.org. |
| **Course hotels** | The participants have to book their accommodation themselves (see map and recommendation on www.epi-winterschool.org/hotels). |