

## PHS 652 Topics in Biostatistics for Epidemiology

### Missing Data: Topics and Tools

Spring 2015

**Goals:** The course is designed to provide students with a basic knowledge of statistical analysis and modeling for missing data. We will focus on case studies of real data examples from biostatistics, epidemiology and social science research to help students understand the literature and available resources for computation via statistical software. Through the course students are expected to be able to detect the missing data problems that they could be faced with in their own research, provide practical solutions and diagnostics.

We will begin with the situations when and why missing data can be a problem and introduce the missing data mechanisms. We then discuss the potential solutions subsequently for different types of missing data, such as continuous versus categorical, ignorable versus non-ignorable. Traditional ways to handle missing data will be covered as well as the problems they could create. We will introduce the background and population approaches for multiple imputation, and extend to handle cases when the missingness is not missing at random. Missing data problems in longitudinal studies will be discussed. If time allows the course will finish with discussions on methods to deal with survey nonresponse, especially under complex sampling design.

**Background required:** The prerequisite is basic understanding on statistical concepts and models, such as having taken courses BMI/PHS 551, 552 and 651, or equivalent as approved by the instructor. Most computer codes will be in the R statistical software language, while students are not required to have prior experience with R.

**Assignments and exams:** Each section of the course will be accompanied by a homework exercise, to be completed in 2 or 3 weeks. Homework will receive full credit by being handed in and any comments responded to. There will be a final take-home project. Grade is based on 60% homework and 40% final exam.

#### **Readings:**

The text and other course materials will be posted at Learn@UW.

#### **Class time and location:**

Class meets Tue/Thu 11-12:15 in room TBD

#### **INSTRUCTOR: Yajuan Si, Ph.D.**

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