

2018 Taipei Medical University statistical short course:

### **Applied longitudinal analysis in medical or public health research**

**Dates:** June 7<sup>th</sup> (Thurs.) and 8<sup>th</sup> (Fri.) 13:30pm – 5:00pm

**Instructor:** Wei-Wen Hsu, Ph.D., Assistant Professor, Department of Statistics, Kansas State University

<http://www-personal.k-state.edu/~wwhsu/>

**Location:** Taipei Medical University

**Course duration:** Total of 7 hours (two consecutive days of 3.5 hours each)

#### **Course description:**

In modern medical research, the outcome or response variable is often measured on a subject/patient repeatedly over time. The data generated from such study are so-called longitudinal data (or correlated data). As a result, there exists certain correlation among these repeated measures and this correlation should be taken into account while performing the data analysis. Ignoring such correlation, the statistical inferences about the population could be invalid and unreliable. In this short course, we will start with the design of classical longitudinal study and then introduce the mixed effects model - a powerful model to deal with the longitudinal or correlated data. With multidisciplinary applications as examples, we will discuss how to perform the mixed effects models with regular statistical software such as SAS or R. Further, we will address some common issues that are often faced in real longitudinal data analysis. Last but not the least, the power analysis and sample size calculation for a longitudinal study is often an important component in grant proposals before the research project is actually proceeded. We will go through these topics with practical examples and all participants are expected to run the longitudinal data analysis themselves with given datasets during the class.

#### **Course schedule:**

	<b>Topics</b>
<b>Day 1 (June 7<sup>th</sup>, Thursday):</b>	<ol style="list-style-type: none"><li>1. The design of longitudinal study</li><li>2. Introduction of mixed effects models</li><li>3. Hypothesis testing for evaluating the treatment effects</li><li>4. How to perform mixed effects models in SAS and R to analyze the longitudinal data</li><li>5. What if your outcome variable is not continuous? Binary or count? Introduction of generalized linear mixed effects model</li></ol>
<b>Day 2 (June 8<sup>th</sup>, Friday):</b>	<ol style="list-style-type: none"><li>1. How to deal with missing data in longitudinal study</li><li>2. Model diagnosis and remediation</li><li>3. Based on your study design - power and sample size calculation</li></ol>

**Target audience:**

Faculty, researchers and collaborators, including graduate students and postdocs with an interest on longitudinal and observational studies in medical or public health research.

**Notes:**

- A background of linear regression and ANOVA would be much preferred
- Prior experience programming with SAS would be preferred but it is not required
- If this course is not given in a computer lab, participants should have available a laptop with SAS software installed