STAT 536E
Statistical Theory for the Design and Analysis of Clinical Studies – BIOSTAT METHODS

Instructor: Lang Wu, Professor, Department of Statistics, UBC, Vancouver
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Lectures: Tuesday & Thursday, 4:00pm – 5:30pm, ESB 4192, Jan 9 – Apr 13, 2023, **3 credits**.

Class webpage: UBC Canvas STAT 536E

Prerequisite: Open to any interested graduate students in the Department of Statistics. Graduate students from other departments are welcome, provided they have sufficient statistical and mathematical backgrounds (roughly, mathematical statistics to the level of UBC STAT 460/461). Such students should consult the instructor about suitability. To be clear, this course is aimed at training statisticians or biostatisticians, so understanding the math and computing behind the methods is the central part of the course.

Class format: A combination of lectures and in-class activities. Class attendance is required. You are strongly encouraged to ask questions in class and actively participate in-class discussions. You are also encouraged to discuss course materials on **Piazza** on Canvas.

Text: No required textbook. Lecture notes and slides will be posted on Canvas.

Course descriptions: This course covers basic ideas of some commonly used statistical models and methods in epidemiologic studies and health research. Since this course covers a wide variety of topics, the emphasis will be on *understanding* of the basic ideas and theory (rather than detailed math derivations), *applications* of the models/methods, and data analysis skills in general. Students interested in more detailed descriptions of these topics are suggested to read the references listed below. Statistical software R will be used in class.

Topics: 1) Types of studies/designs in biostatistics; 2). Analysis of binary data, including 2×2 tables; 3). Analysis of survival data, including censoring, KM estimator, log-rank test, Cox models, and AFT models; 4). Analysis of longitudinal data and clustered data, including mixed effects and GEE models; 5). Other topics (if time allows): missing data analysis, model selections, confounding, etc.

Evaluation: Class participation (attendance, in-class activities/discussion) 20%, homework 30%, oral presentation: 10%, final project (written report) 40%. The weights may be adjusted if necessary.

References:

Lachine, J.M. (2000). Biostatistical Methods: The Assessment of Relative Risks, Wiley.

Vittinghoff, E., Glidden, D.V., Shiboski, S.C., and McCulloch, C.E. (2011). Regression Methods in Biostatistics: Linear, Logistic, Survival, and Repeated Measures Models. Second edition, Springer.

Wu, L. (2009). Mixed Effects Models For Complex Data. Chapman and Hall/CRC.