Course Title: Life Tables and Survival Analysis

Course Number: QNME 0613

Course Location: New Jersey Medical School Medical Science Building F506b

Course Date & Time: Tuesday 5:30-8:30 January 20, 2015-May 13, 2015

Course Instructor: Soyeon Kim, ScD, Associate Professor, Department of Quantitative Methods: Epidemiology and Biostatistics MSB F631, sk1362@njms.rutgers.edu, 973-972-8809

Office Hours: By appointment only

Course Assistant: none


Course Description: To learn how to describe, compare, fit regression models for survival data, and to design survival studies.

Selected Department Competencies Addressed: The competencies addressed in this course for the MPH and/or MS degrees in the Department of Quantitative Methods: Epidemiology and Biostatistics include:

- Critically evaluate epidemiological data and findings;
- Communicate results from epidemiologic studies; and
- Demonstrate proficiency in the use of a variety of software packages used in epidemiology (SAS and R);
- Conceptualize public health or clinical research questions using quantitative methods;
- Conceptualize public health or clinical research questions using advanced quantitative methods techniques;

Please visit the Department webpages on the School of Public Health’s website at http://sph.rutgers.edu/ for additional competencies addressed by this course for other degrees and departments.

Course Objectives: By the completion of this course, students will be able to:

- To identify different forms of censoring and violations of assumptions regarding censoring required by classical survival analysis methods;
• To describe survival data both numerically and graphically;
• To test whether survival distributions differ between two or more groups and quantify differences;
• To model survival data, both parametrically and non-parametrically;
• To calculate sample sizes/power; and
• To use statistical software (SAS and R) to analyze survival data.

Course Requirements and Grading:

• Homework assignments, a final, and class participation will be the basis for grading. Assignments will require the student to critically review articles in the peer review literature, estimate survival distribution(s), fit parametric and semi-parametric models, and perform sample size/power calculations.

Grading

1. Homework Assignments 60 pts
2. Final 30 pts
3. Participation 10 pts

Total: 100 pts

Course Schedule:

Week 1, January 20, 2014

• Lecture topic: Introduction, definitions, notation, examples
• Read Collett Chapter 1 Survival Analysis

Week 2: January 27, 2014

• Class cancelled due to inclement weather
• Assignment 1 due beginning of class

Week 3: February 3, 2014

• Critical review: Zar et al. will be discussed in class
• Lecture topic: non-parametric estimation of the survivor and hazard function
• Read Collett Chapter 2.1-2.5 Some Non-parametric Procedures

Week 4: February 10, 2014

• Lecture topic: non-parametric estimation of the survivor and hazard function (cont.)
• Read Collett Chapter 12.1, 12.2.1-12.2.2 Computer Software for Survival Analysis
Week 5: February 17, 2014

- Lecture topic: Comparing two or more survivor distributions (group comparisons)
- Read Collett Chapter 2.6-2.9 Some Non-parametric Procedures (cont.)
- Assignment 2 due

Week 6: February 24, 2014

- Lecture topic: Modeling survival data using the semi-parametric Cox proportional
  hazards model: The proportional hazards model
- Read Collett Chapter 3.1-3.4, 3.7 Modelling Survival Data
- Assignment 3 due

Week 7: March 3, 2014

- Lecture topic: Modeling survival data using the semi-parametric Cox proportional
  hazards model: Comparing alternative models, model selection methods, and model
  checking
- Read Collett Chapter 3.5-3.6, 3.9 Modelling Survival Data (cont.)
- Assignment 4 due

Week 8: March 10, 2014

- Lecture topic: Modeling survival data using the semi-parametric Cox proportional
  hazards model: Estimating the hazard and survivor functions, and the relationship
  between the proportional hazards model and the log-rank test.
- Assignment 5 due

March 17, 2014

- SPRING BREAK

Week 9: March 24, 2014

- Lecture topic: Parametric proportional hazards survival models
- Read Collett Chapters 5 Parametric Proportional Hazards Models and Chapter 7 Model
  Checking in Parametric Models
- Assignment 6 due

Week 10: March 31, 2014

- Lecture topic: Modeling time-dependent variables in the Cox model
- Read Collett Chapter 8 Time-dependent Variables
- Assignment 7 due
Week 11: April 7, 2014

- Lecture topic: Interval-censored survival data
- Read Collett Chapter 9 Interval-Censored Survival Data
- Assignment 8 due

Week 12: April 14, 2014

- Lecture topic: Introduction to R software
- Assignment 9 due

Week 13: April 21, 2014

- Lecture topic: Sample size calculations for survival studies
- Read Collett Chapter 15 Sample Size Requirements for a Survival Study (chapter depends on edition)
- Assignment 10 due

Week 14: April 28, 2014

- Lecture topic: Competing risks estimate of the survivor distribution
- Read handouts (Satagopan et al, Lau et al) and Collett Chapter 13 Competing Risks (only in 3rd edition)
- Assignment 11 due

Reading Day: May 5, 2014 (will have class because of snow day)

- Lecture topic: Other models/topics
- Reading: TBD
- Assignment 12 due

Week 15: May 13, 2014

- Final due

School of Public Health Honor Code: The School of Public Health Honor Code is found in the student bulletin (sph.rutgers.edu/academics/catalog/index.html). Each student bears a fundamental responsibility for maintaining academic integrity and intellectual honesty in his or her graduate work. For example, all students are expected to observe the generally accepted principles of scholarly work, to submit their own rather than another’s work, to refrain from falsifying data, and to refrain from receiving and/or giving aid on examinations or other assigned work requiring independent effort. In submitting written material, the writer takes full responsibility for the work as a whole and implies that, except as properly noted by use of quotation marks, footnotes, etc., both the ideas and the works used are his or her own. In addition to maintaining personal academic integrity, each student is expected to contribute to the academic integrity of the school community by not facilitating inappropriate use of her/his own work by others and by reporting acts of academic dishonesty by others to an appropriate school authority. It should be clearly understood that plagiarism, cheating, or other forms of academic dishonesty will not be
tolerated and can lead to sanctions up to and including separation from the Rutgers School of Public Health.

Policy Concerning Use of Recording Devices and Other Electronic Communications Systems:
When personally owned communication/recording devices are used by students to record lectures and/or classroom lessons, such use must be authorized by the faculty member or instructor who must give either oral or written permission prior to the start of the semester and identify restrictions, if any, on the use of mobile communications or recording devices.