

Department of Public Health Sciences and Epidemiology  
PH 753  
Life Table and Survival Analysis  
Spring 2007

Meeting Place: Biomed D211, TTH 1 - 2:15 PM

Instructor Information:

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Office Hours: Following class, or by appointment, or when available in Biomed D104G

Course Description: The course will extend material covered in PH 747 and PH 656 to applications in the analysis of survival data. Course lectures will focus on development of tools and methods used to analyze this type of data, and application of these concepts to simple problems and to survival data sets will be required in the homeworks. While limited guidance in software application for survival analysis will be provided, knowledge of basic computer applications and a robust statistical package (e.g. R, SAS, Stata, etc) is assumed, and required for some of the later homework assignments.

Course Learning Objectives: Practice in addressing statistical problems and working with data is critical to being able to utilize statistical methods and tools you will learn in class. Thus the course attempts to not only provide a basic understanding of many concepts and tools of survival analysis, but through the homework assignments emphasizes practical application of these methods.

Required Text: None strictly required, though recommended texts are listed in order of recommendation

Recommended: Hosmer & Lemeshow, Applied Survival Analysis 1999 (expensive but good)  
Le, Applied Survival Analysis (1997) (inexpensive, paperback)  
Kleinbaum, Survival Analysis - A Self-Learning Text (1996) (good introductory text)  
Some data sets in examples are found in Breslow N., Day N., Statistical Methods in Cancer Research, Vol 2, 1987

Software: R will be the Software "supported" and most class examples will be presented in R and/or Stata. However, students are free to use any statistical packages with good survival analysis capabilities: R, S-Plus, SAS, Stata, SPSS...computer lab has R, SAS, JMP, and Stata (I think) available. Note that R is freeware and can be downloaded for personal use.

Course Schedule: Proposed topics and order to be covered (subject to change):

1. Introduction to Survival Data
  - a. Time-to-Event data in epidemiology
  - b. Survival distributions
  - c. Censoring types
  - d. Data layout
  
2. Non-Parametric methods for censored survival analysis
  - a. Life Table (actuarial) tabulation
  - b. Product-Limit (Kaplan-Meier) Estimator
  - c. Nelson Cumulative Hazard Estimator
  - d. Other estimators?
  - e. Logrank, Gehan/Breslow and Peto/Prentice tests
  - f. Trend test?

3. Introduction to the Cox regression model
  - a. Forms of the model
  - b. Interpretation of parameters
  - c. Estimator, Confidence Intervals, and Test Statistics
  - d. Relationship to K-sample methods
  - e. Stratification
4. Advanced topics in Cox regression and its application to cohort studies
5. Parametric methods for censored survival analysis
6. Approximating continuous time data with grouped data
7. Relationships between cox regression and poisson regression for followup data, and logistic regression for case-control data
8. Further topics in logistic regression

Course Policies:

- Homework assignments must be received **when due** to receive full credit. Partial credit for late homework will be severely restricted
- Plagiarism will result in a failing (“F”) grade for the assignment. Students should familiarize themselves with the university of Hawai’i Student Conduct Code. Public Health students have been expelled from the University for failing to adhere to these policies; thus please take these policies seriously.
- Extra credit questions will occasionally be supplied on homework assignments, but will only contribute minor points.

Description of Course Assignments: There will be 5 to 7 homework assignments throughout the semester, which will be posted on the class website (above) and usually due one week later. The assignments will focus on application of what is covered in class to data sets, and will several will require computer applications

Grading Scale for Class Assignments:

Grading Points	Percentage
Class participation	10%
Homework Assignments	35%
Mid-term Examination	25%
Final Examination	30%

Grading Scale: I will be using the “+ -” grading system

Specialization/MPH Competencies Addressed: Among the competencies addressed in this class are:

- AS2 – Determine appropriate use of data and statistical methods
- AS4 – Evaluate the quality and comparability of data and identify gaps in data sources
- PHS4 – Use advanced computer skills as appropriate
- E4 - Apply appropriate statistical tests for parametric and nonparametric settings and identify advanced statistical methods for analyzing both nominal and continuous data, for both univariate and multivariate applications.