University of Washington Department of Biostatistics
11th Annual Summer Institute in Statistics for Clinical & Epidemiological Research

Module 4: Introduction to Survival Analysis

July 11 – 12, 2024

- **Instructors**
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- **Instruction Hours**
  Lectures: 8:30am – 10:00am, 10:30am – 12:00noon
  Break: 10:00am – 10:30am

- **Course Description**
  Censored time-to-event data, where not all subjects experience the event of interest, are common in biomedical research. This module introduces some essential statistical tools for analyzing censored time-to-event data and emphasizes methods for clinical trials. The module will:

  – Introduce important functions, including survival curves, the hazard function, and the median survival time, in analyses of time-to-event data;
  – Review life-table analysis, and introduce one-sample Kaplan-Meier estimation of survival curves;
  – Introduce the two-sample log-rank test, and alternative testing procedures that weight group comparisons differently over the follow-up time interval;
  – Introduce the Cox proportional hazards model for regression analysis of the association between an explanatory variable and a censored event-data outcome;
  – Describe power and sample size calculation for a clinical trial with censored time-to-event outcomes;
  – Describe how information is accrued when there is group-sequential monitoring of a clinical trial;
  – Discuss other topics, such as competing risks and biased sampling, arising from observational studies, if time permits.

  The course will focus on application and understanding the concepts with examples from the literature; mathematical details will be kept to a minimum. Working knowledge of basic probability and statistical concepts will be assumed.

- **Course Evaluation**
  Two problem sets, four in-class quizzes, and answer keys will be handed out for practice and self-evaluation.

- **Recommended Textbooks**
Kleinbaum, DG & Klein, M (2012) *Survival Analysis: A Self Learning Text, 3rd Ed.* Springer.
Hosmer, DW, Lemeshow, S & May, S (2008) *Applied Survival Analysis: Regression Modeling of Time-to-Event Data, 2nd Ed*. Wiley.

- **Course Calendar**
  - July 11: Problem Set 1 assigned; Quizzes 1 and 2
  - July 12: Problem Set 2 assigned; Quizzes 3 and 4

- **Course Outline**
  - Background
    - Brief history of survival analysis
    - Time-to-event and censoring
    - Life tables
  - Parametric Methods
    - Parameter distributions
    - Likelihood functions and maximum likelihood
  - Kaplan-Meier Curves
  - Log-Rank Tests
  - Cox Proportional Hazards Model
  - Additional Topics

- **Zoom Meeting Information**

Topic: UW SISCER 2024 Mod 4 Survival Analysis
Time: Jul 11, 2024 08:30 AM Pacific Time (US and Canada)
    Every day, 2 occurrence(s)
    Jul 11, 2024 08:30 AM
    Jul 12, 2024 08:30 AM

Join from PC, Mac, Linux, iOS or Android:
https://stanford.zoom.us/j/94925057407?pwd=aIMjTLpvrjbjmTsgZwg8sBCRqhinuv.1
    Password: 976972

Or iPhone one-tap (US Toll): +18333021536,,94925057407# or +16507249799,,94925057407#

Or Telephone:
    Dial: +1 650 724 9799 (US, Canada, Caribbean Toll) or +1 833 302 1536 (US, Canada, Caribbean Toll Free)
    Meeting ID: 949 2505 7407
    Password: 976972
    International numbers available: https://stanford.zoom.us/u/acWGWitQ9A
    SIP: 94925057407@zoomcrc.com
    Password: 976972

- **Slack Channel**

https://uwsiscer2024.slack.com/archives/C077AK7UHPT