

UW SISCER 2020

Module 12: Joint Modeling of Longitudinal and Survival Data

July 30–31, 2020

Longitudinal studies follow individuals over time and repeatedly measure health status. Analyses of longitudinal data are often complicated by several factors that can threaten the validity of standard analysis methods. First, missing data in longitudinal outcomes can arise when individuals are lost to follow-up, either due to drop-out (e.g., in randomized trials) or death (e.g., in long-term observational studies). Second, when modeling intermittently measured time-dependent covariates in a survival analysis, biological variation can lead to measurement error. Joint modeling of longitudinal and survival outcomes has emerged as a novel approach to handle these issues.

We will detail the use of mixed-effects models for the analysis of repeated longitudinal measures, Cox regression models for the analysis of event-time outcomes with longitudinal measures as time-dependent covariates, and their combination in a joint modeling framework. An in-depth data analysis (conducted in R) will be used to discuss analysis strategies, the application of appropriate analysis methods, and the interpretation of results.

Overview and Schedule

* All times are Pacific Daylight Time (PDT)

Thursday, July 30

8:30 – 8:45	Introductions and logistics	Live lecture
8:45 – 9:00	Motivation and examples	Live lecture
9:00 – 9:30	Longitudinal data analysis	Live lecture
9:30 – 9:45	Break	
9:45 – 10:15	Longitudinal data analysis	Live lecture
10:15 – 10:45	Data analysis and discussion	Live lecture + on your own
10:45 – 11:00	Break	
11:00 – 11:45	Survival data analysis	Live lecture
11:45 – 12:00	Wrap-up and questions	Live lecture

Friday, July 31

8:30 – 8:45	Review and questions	Live lecture
8:45 – 9:00	Survival data analysis	Live lecture
9:00 – 9:30	Data analysis and discussion	Live lecture + on your own
9:30 – 9:45	Break	
9:45 – 10:45	Joint regression models	Live lecture
10:45 – 11:00	Break	
11:00 – 11:30	Data analysis and discussion	Live lecture + on your own
11:30 – 12:00	Discussion and summary	Live lecture

Resources

- All course materials and links are posted on the SISCER Module 12 webpage (access for module registrants only).
- Links to a pre-module and post-module survey are posted on the SISCER Module 12 webpage. Please complete these to facilitate tracking of your knowledge and skills.
- All live lectures will take place via Zoom.
 - Links to live sessions are posted on the SISCER Module 12 webpage.
 - Please keep your audio muted unless you are speaking.
 - Please feel free to interrupt and ask questions!
 - Live lectures will be recorded, with access to recordings provided via the SISCER Module 12 webpage.
- A Slack channel (`mod12_joint_modeling`) in the SISCER Slack workspace is available for discussion and questions outside of live lectures.
- All data analyses will be conducted using the current version of R (www.r-project.org) within RStudio (www.rstudio.com). Please have the `JM`, `ggplot2`, `survminer`, and `dplyr` extension packages installed in advance.
- R commands will be provided in both an R script file (`.R`) and an R Markdown file (`.Rmd`). If you wish to execute the R Markdown file, please install the necessary extension packages in RStudio.
- After the course, please complete the course evaluation through your SISCER account. I appreciate your feedback! (After you complete the evaluation, you will be able to download a certificate of completion.)