

This quarter in my STAT499 independent research course, I learned pretty much all there was to know regarding proportional hazard modeling. Going into this quarter, I was very green behind the ears with basic survival analysis and the concept of learning proportional hazards derived from the desire to work with high dimensional time series data sets. While I was initially on my own in discovering resources to learn this topic, I eventually found help within the University of Washington's Department of Biostatistics in Professor Jon Wakefield and his amazing lectures in survival analysis. His tools and resources aided in my learning ten-fold, and I feel confident in my understanding of proportional hazards having learned from one of the best biostatistics instructors in the world.

For proportional hazards, I first learned the fundamentals of survival analysis. This included censoring and truncation and why those artifacts necessitate survival analysis functions over regular regression. I learned about parametric estimators of survival analysis including the exponential, Weibull, and Generalized Gamma distribution. I then learned about non-parametric estimators such as the Kaplan-Meier estimator of survival probability and the Nelson-Aalen estimator of cumulative hazards. Then, I moved onto learning the semi-parametric approach of proportional hazards, which is called semi-parametric because the math behind its methods means the coefficients don't depend on a baseline hazard. I learned the intuition and proofs of proportional hazards from both an applied and theoretical sense. I also learned how proportional hazards work in R, which is where I expect the majority of my work to be in. I plotted proportional hazards and interpreted coefficients just as you would for odds ratios. I also learned about complex hazards with multiple covariates and even stratification! Overall, this was a wonderful topic and I'm thankful I was able to participate in this Statistics DRP and learn about such a cool statistical topic.