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Statistical Analysis of Complex Event History Data

Survival and Event history analysis denote a set of statistical methods used to analyse and describe life times, durations and more complex event histories. It is the traditional tool for analysing incidence and prognosis of cancer and other chronic diseases, but is also of importance in fields like demography, social science, economics, and technical reliability. Although a large body of theory and methods exists, the methodology for analysing complex event histories, with many events and concomitant information (covariates) measured at the entry to the study and during the follow up, is still not well developed. One example would be a clinical study where success of a treatment cannot only be measured by survival, but also by how the course of the disease develops, e.g., with respect to periods of remission and quality of life. The purpose of the project at the Norwegian Centre for Advanced studies is to contribute to the development of statistical methodology for complex event history data. In particular we aim to

- study connections with modern methods of causality
- study methods that account in a realistic way for unobserved heterogeneity
- study methods for proper inclusion of high dimensional gene expression data in the analysis of survival and event history data
- develop alternatives to the commonly used Cox regression that are better suited to handle dynamic covariates and time-varying covariate effects
- develop useful summary measures of complex event histories