

External project for Master thesis in Mathematical statistics spring 2022

Topic: Methodological considerations in population-based cancer patient survival analysis

Title: Recurrent event analysis for estimating childbearing patterns after chemotherapy treatment for aggressive hematologic malignancies

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Background

Among young individuals diagnosed and treated for cancer, fertility issues and late adverse effects of treatment are increasingly important to understand and to consider in clinical follow-up. This project is designed to be performed within a large ongoing project that aims to advance the knowledge of childbearing potential after lymphoma treatment with focus on differences by sex, lymphoma subtype and treatment. Previous work in this area has demonstrated a reduced child-bearing potential in women treated for lymphoma, compared to matched women free from lymphoma, in particular during the first three years after treatment completion.

Description

The project builds upon previous work but will focus specifically on methodological aspects of modelling recurrent event data (i.e., moving from time-to-first child birth to incorporating multiple child births in the same woman). Although several methods exist for handling recurrent event, these methods are rarely used in practice. The overall aim of the project is to review the literature for the existing methods (e.g., Poisson/negative binomial regression, the Prentice, Williams, and Peterson (PWP) gap time and total time models, Andersen-Gill models, and adaptations for parametric survival models), and to discuss the assumptions, interpretation and application of these models to observational data from quality of care registers. Possible extensions include estimation of cumulative incidence functions (i.e. probability of childbearing in the presence of the competing risk of cancer relapse and death), as well methods used for repeated events in a causal inference framework (i.e. doubly robust methods). An overall aim of the project will be to inform the choice of method for future studies in this field in our research group.

To illustrate the methods, the project will use observational register-based data from a population-based cohort of all young (< 40 years at diagnosis) women diagnosed with lymphoma in Sweden between 2000-2018. The data will be maintained at Karolinska Institutet and the master student will be invited to work with the data locally in our department.

For more information about the biostatistics activities at Clinical Epidemiological Division, please visit: <https://ki.se/en/meds/biostatistics-at-kepcpe>