Statistical methods for the dynamic prediction of survival in settings with numerous longitudinal predictors

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To make informed decisions, clinicians and patients rely on accurate predictions of the probability to experience adverse events such as dementia, cancer or death.

Dynamic prediction models allow to estimate the probability of experiencing an adverse event of interest, and to update our estimates as more longitudinal data are collected.

Although the diffusion of electronic health records and of techniques that allow to measure thousands of biomarkers has led to an abundance of longitudinal data that could be used to inform and update predictions, until recently we lacked methods that could handle numerous longitudinal covariates as predictors of survival outcomes.

In this talk I will provide an overview of four dynamic prediction methods that were recently proposed to deal with datasets that feature a large number of longitudinal predictors. Moreover, I will present the results of a benchmarking study that assessed the predictive performance of such methods in three different longitudinal studies, showing that some approaches consistently outperform the others. I will conclude with a short tutorial on the R package pencal, which has been designed to streamline the estimation and validation of one of the top-performing methods.

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