

## **Risk re-classification boxplots**

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Being able to illustrate, in a simple and clear way, the association between a new biomarker and clinical outcome is critical. This is particularly important, and methodologically challenging, when the outcome is time to event with competing risks and right censored observations. Before examining a new predictor it is important to recognize the existing predictors. These existing predictors should first be assembled in a model that serves as the benchmark for the upcoming analysis. In the next step the biomarker has to be added to the benchmark model somehow. For a given prediction horizon, say  $t$ -years after baseline, one calculates for each subject two predicted risks (risk = probability of the event before the prediction horizon), one based on the benchmark model and one based on the new model which adds the biomarker. To illustrate the effect of the biomarker on the predicted risks we look back in time from the prediction horizon, and examine the distribution of predicted risks and changes of predicted risks due to the biomarker conditional on the event outcome status of the subject when this is evaluated at the prediction horizon. The advantages and limitations of these ideas will be illustrated using a cancer data set.