

Evaluating the Predictive Value of Biomarkers with Failure Time Outcome

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Abstract

Identification of novel biomarkers for risk assessment is important for both effective disease prevention and optimal treatment recommendation. In biomarker studies it is now well recognized that it is important to evaluate the predictive value of a novel prediction model in multiple ways. In addition to the traditional receiver operating characteristic (ROC) curves, recently the concept of reclassification such as the Net Reclassification Improvement (NRI) and Integrated Discrimination Improvement (IDI) has been introduced to characterize the predictive values of a risk prediction procedure. We propose semiparametric and nonparametric methods to calculate these summary measures when outcome is censored failure time outcome. Estimation procedures under different data sources are considered. Simulation results suggest that these proposed procedures perform well in finite samples. Application is made to a breast cancer study.

Keywords: ROC curve; IDI; NRI; Survival analysis.

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