A New Class of Semiparametric Copula Mixture Cure Models: Analaysis of SEER Prostate Cancer Data

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Abstract: This talk discusses cure detection among the prostate cancer patients in the NIH Surveillance Epidemiology and End Results (SEER) program, wherein the main endpoint (e.g. deaths from prostate cancer) and the censoring causes (e.g. deaths from heart diseases) may be dependent. While a number of authors have studied the mixture survival model to analyze survival data with nonnegligible cure fractions, none has studied the mixture cure model in the presence of dependent censoring. To account for such dependence, we propose a more general class of cure models that allow for dependent censoring. We derive the cure models from the perspective of competing risks and model the dependence between the censoring time and the survival time using a class of Archimedean copula models. Within this framework, we consider the parameter estimation, the cure detection, and the two- sample comparison of latency distributions in the presence of dependent censoring when a proportion of patients is deemed cured. Large sample results using the martingale theory are obtained. We examine the finite sample performance of the proposed methods via simulation and apply them to analyze the SEER prostate cancer data.