

International Biometric Society

Omnibus Tests for comparison of competing risks
with covariate effects

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It is of interest that researchers study competing risks in which subjects may fail from any one of K causes. Comparing any two competing risks with covariate effects is very important in medical studies. We develop omnibus tests for comparing cause-specific hazard rates and cumulative incidence functions at specified covariate levels. In the paper, the omnibus tests are derived under the additive risk model by a weighted difference of estimates of cumulative cause-specific hazard rates. Simultaneous confidence bands for the difference of two conditional cumulative incidence functions are also constructed. A simulation procedure is used to sample from the null distribution of the test process in which the graphical and numerical techniques are used to detect the significant difference in the risks. In addition, we conduct a simulation study, and it shows that the proposed procedure has a good finite sample performance. A melanoma data set in clinical trial is used for the purpose of illustration.