



On comparing competing risks using the ratio of their cumulative incidence functions

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Abstract

For $1 \leq i \leq r$, let F_i be the cumulative incidence function (CIF) corresponding to the i th risk in an r -competing risks model. We assume a discrete or a grouped time framework and obtain the maximum likelihood estimators (m.l.e.) of these CIFs under the restriction that $F_i(t)/F_{i+1}(t)$ is nondecreasing, $1 \leq i \leq r - 1$. We also derive the likelihood ratio tests for testing for and against this restriction and obtain their asymptotic distributions. The theory developed here can also be used to investigate the association between a failure time and a discretized or ordinal mark variable that is observed only at the time of failure. To illustrate the applicability of our results, we give examples in the competing risks and the mark variable settings.

Keywords Competing risks · Cumulative incidence function · Likelihood ratio test · Chi-bar squared distribution

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