

An asymptotic theory for the nonparametric maximum likelihood estimator in the Cox gene model

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The Cox model with a gene effect for age at onset was introduced and studied by Li, Thompson and Wijsman. We study the nonparametric maximum likelihood estimation of the gene effect and the regression coefficient in this model. We indicate conditions under which the parameters are identifiable and the nonparametric maximum likelihood estimate is consistent and asymptotically normal. We also apply the theory of observed profile information to obtain a consistent estimate of the asymptotic variance. Besides providing theoretical support for Li *et al.*, our work provides an alternative approach to the numerical methods in this model.

Keywords: age at onset; asymptotic normality; Cox gene model; discrete frailty model; identifiability; nonparametric maximum likelihood estimate; profile likelihood information