

INFERENCE ON CLUSTERED SURVIVAL DATA USING IMPUTED FRAILTIES

Yi Li

Harvard University and Dana-Farber Cancer Institute

We propose a new method for fitting frailty models to clustered survival data that is intermediate between the fully parametric and nonparametric maximum likelihood estimation approaches. A parametric form is assumed for the baseline hazard, but only for the purpose of imputing the unobserved frailties. The regression coefficients are then estimated by solving an estimating equation that is the average of the partial likelihood score with respect to the conditional distribution of frailties given the observed data. We prove consistency and asymptotic normality of the resulting estimators and give associated closed-form estimators of their variance. The algorithm is easy to implement and reduces to the ordinary Cox partial likelihood approach when the frailties have a degenerate distribution. Simulations indicate high efficiency and robustness of the resulting estimates. We apply our new approach to a study with clustered survival data on asthma in children in East Boston.

E-mail address: yili@jimmy.harvard.edu