



Bin Nan, PhD
University of Michigan
Department of Biostatistics
Thursday, March 24, 2016
3:30 pm, A115 Crabtree Hall

Regression with Covariate Subject to Limit of Detection

We consider generalized linear regression with left-censored covariate due to the lower limit of detection. The complete case analysis by eliminating observations with values below limit of detection yields valid estimates for regression coefficients, but loses efficiency. Substitution methods are biased; and maximum likelihood method relies on parametric models for the unobservable tail probability, thus may suffer from model misspecification. To obtain robust and more efficient results, we propose a semiparametric likelihood-based approach for the regression parameters using an accelerated failure time model for the covariate subject to limit of detection. A two-stage estimation procedure is considered, where the conditional distribution of the covariate with limit of detection given other variables is estimated prior to maximizing the likelihood function for the regression parameters. The proposed method outperforms the complete case analysis and the substitution methods as well in simulation studies. Asymptotic properties are provided. This is a joint work with Shengchun Kong.