

# Estimation of survival under dependent truncation

Jing Qian

*University of Massachusetts  
E-mail: qian@schoolph.umass.edu*

**Abstract:** In clinical trials designed to assess the treatment effect on survival, patients are required to survive from the time of diagnosis to recruitment. This results in samples with left truncated distributions of event time. Standard survival analysis methods for estimation of the distribution of the event time require quasi-independence of event time and truncation time. When quasi-independence does not hold, standard methods may yield biased estimation. We propose two types of methods for estimation of survival under dependent truncation. One is a transformation model approach to model a latent quasi-independent truncation time as a function of the observed dependent truncation time and the event time and an unknown transformation parameter. The proposed method can accommodate right censored data. The other one is an inverse-probability-weighting type approach to accommodate the dependent truncation induced by covariates. We evaluate the proposed methods through extensive simulations and apply them to clinical studies of neurological diseases.