Truncation, Length Bias and Prevalent Sampling

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Abstract

When studying the natural history of a disease, a prevalent sampling design which draws samples from a diseased population is generally more focused and practical than incident sampling design. Length-biased distribution is a probability distribution resulting from a biased sampling scheme in which the probability of observing a failure time variable is proportional to the value of the variable itself. Truncation is a sampling mechanism for observing incomplete data where a failure time variable is observable only when it falls into a certain region. When the failure time falls outside the region, the information about the variable is lost and therefore excluded from the data set. This talk will discuss the roles of length-bias and truncation in prevalent samples, and review the probabilistic characteristics of length-bias and truncation in the presence or absence of censoring. The discussion will extend to the non-stationary case where more general formulation is required for deriving statistical inferences. In particular, the prevalent sampling for a cure model will be considered as a non-standard case where the standard truncation techniques are not applicable. Nonparametric approaches are explored and developed to address the problem.