Double censoring: Estimating the distribution of the time between two events, when the time of the first event is not observed precisely

Philip Hougaard

February 24th, 2014

Abstract

Double censoring refers to the analysis of the time between two events, which are both subject to censoring. A typical example is the time from HIV infection to outbreak of AIDS. The time of HIV infection is unknown, but if blood samples are available, it is possible to determine an interval in which the infection took place. The time of outbreak of AIDS is either observed or censored (if the event has not happened at the end of the study). Thus the interesting time scale is not known or rather it is not known precisely. A simple, but not necessarily satisfactory, way of handling this issue is to assume the infection took place at the midpoint of the interval in which it is known to have happened. If one wants to do something better than this, it is necessary to consider the infection time as random, that is, to set up a more complex model for the whole course of events. This creates a need for dedicated methods, which are extensions of methods for interval-censored survival data. I will discuss the issues and present some methods from the literature.