Impact of Censoring in Survival Analysis

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Abstract

In the survival analysis set up comparison of two or more survival distributions in the presence of right censoring is usually done using Log-rank test or its modifications, which are available in various standard statistical software packages now. However, in such comparisons it is commonly assumed that that the censoring distributions for the two (r) groups are same. It is well known that for right censored data the number of deaths, in general, is random and the construction of the test statistic is complicated by the censoring mechanisms e.g. see Kalbfleisch and Prentice (2003). However, the manner in which various censoring mechanisms may impact the test statistic is not clear. Although, it is generally perceived, e.g. see Hougaard (2000), that the asymptotic inference based on Fisher's information can be performed irrespective of the censoring distribution whether it is fixed or random. In this paper we take the statistics proposed by Harrington and Fleming (1982) and assess its validity and robustness for comparing two survival distributions when the underlying censoring distributions may not be same. We find that, in some settings, when the censoring proportions are not too different then the test statistics maintain type I error control but when the censoring proportions are too discrepant the tests may become anticonservative or may loose efficiency in terms of power. Their blanket use irrespective of the situation may be questionable. Further, if time permits, we will also assess if there is any advantage in modeling the failure time distribution by postulating a relationship between the censoring and failure time distributions.