PROCEDURES FOR SERIAL TESTING IN CENSORED SURVIVAL DATA

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1. Introduction

Prospective studies, such as those carried out in many cancer centers throughout the world, need to be carefully monitored and subjected to interim analyses to satisfy important ethical considerations. Typically, the therapeutic efficacy and resulting survival distribution for an experimental treatment regimen are compared to the efficacy and survival obtained from a currently accepted standard regimen. These studies often give rise to the dual need to terminate as soon as possible any trial in which it is sufficiently clear either that (1) the experimental treatment yields better results than the standard treatment or (2) the data strongly contradict the hypothesis of some minimally acceptable treatment difference. In this paper, we examine the problem of constructing closed sequential experimental designs allowing for hypothesis tests at multiple points in time when the data gathered are censored failure time data. The tests we study are useful for examining various forms of dependence of an underlying survival function $S(x)$ on a random scalar covariate Z.