ESTIMATION OF THE RATIO OF HAZARD FUNCTIONS

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1. Introduction

In a clinical trial in which comparison of survival across treatment groups is of interest, it is useful to have a descriptive measure of the difference in survival between groups. If the hazard functions in two groups are roughly proportional, then the ratio of hazard functions has the interpretation of relative risk and has intuitive appeal as a descriptive statistic.

In this paper we investigate the large sample properties of several estimators of relative risk. The experimental setting envisioned is the clinical trial or other similar situations in which survival is being measured, and in which there are possibly different potential follow-up times for each patient.

The notation and model are given in Section 2. Section 3 presents the maximum likelihood estimator based on an exponential model, and the maximum partial likelihood estimator of Cox (1972;1975). Various other approaches are indicated in Section 4, and one, the Mantel-Haenszel (1959) estimator, is investigated in