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SEQUENTIAL ALLOCATION INVOLVING SEVERAL TREATMENTS

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Abstract

A clinical trial model is considered in which $k \geq 2$ treatments are compared and treatment allocation is data-dependent. A sequential procedure for determining the best treatment is investigated that is a natural generalization of the test for two treatments studied by Robbins and Siegmund (1974). It is shown by extensive simulation that the error probability for the procedure is insensitive to the data-dependent allocation rule used. The estimation formulae of Coad (1994) are shown to give good approximations to the bias and variance of estimators of treatment differences.

1. Introduction. Suppose a clinical trial is conducted in which patients can be allocated to one of $k \geq 2$ treatments. The response variable for treatment i at time j, X_{ij} $(j = 0, 1, \ldots)$, is normally distributed with mean μ_i and variance unity. The sequential procedure we shall consider is symmetric with respect to the ordering of the treatments, so properties of the procedure will be invariant under permutations of the means. Thus, although the means are unknown, we shall assume for convenience that $\mu_1 > \mu_2 \geq \mu_3 \geq \cdots \geq \mu_k$. During the trial, a treatment can be eliminated if it does not look promising. At the end

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