Adaptive Designs
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RANDOMIZED ADAPTIVE DESIGNS

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Abstract

Ethical considerations in the conduct of clinical trials have led to the proposal of adaptive allocation schemes. Because of the deterministic nature of their treatment assignment rules, however, adaptive designs are susceptible to experimenter bias, and are insensitive to time trends in the data. For these and other reasons it is desirable to introduce some randomization into the adaptive allocation. In this paper, a class of randomized adaptive designs is introduced, and some renewal-theoretic tools needed for the analysis of such designs are developed.

1. Introduction. In clinical trials, it is desirable to include some measure of the ethical cost of assigning a patient to an inferior treatment, and then to find a design which minimizes the total cost of the trial. For example, it may be desired to minimize the expected number of patients on the inferior treatment, or to minimize some function of this and the total sample size. Such considerations have led to the proposal of adaptive designs, *i.e.*, designs for which treatment assignments may depend on the responses of previous patients in the trial.

Since adaptive designs have deterministic treatment assignment rules, they are susceptible to experimenter bias, and are insensitive to time trends in the data. (In Section 2, these problems will be illustrated

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