

RECENT RESULTS ON USING THE PLAY THE WINNER SAMPLING RULE WITH BINOMIAL SELECTION PROBLEMS

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1. Introduction

The theory of clinical trials has been studied from many different points of view in recent years. Perhaps the feature of principal interest that distinguishes the clinical trial from analogous problems that arise in industrial statistics is the ethical factor. The doctor treating a patient in a clinical trial is not only obliged to derive information relevant for the treatment of a larger statistical population, but is also obliged to treat each patient in the best way that he is able. These two requirements are contradictory to a certain extent, and lend urgency to the design of clinical trials that goes at least part of the way towards incorporating both requirements in some rational fashion. Armitage's monograph [2] and a subsequent review by Anscombe [1] did much to frame the general problem and bring it to the attention of statisticians. Although Armitage's original thinking had envisaged a fairly straightforward application of sequential analysis to the choice of the better of two treatments, Colton, working at his suggestion [4] developed a different formulation that has attracted some interest.

In brief, Colton's model assumes that the total patient horizon N is known. Of these, a total of $2n$ patients are to be used to derive information about the relative worth of the two treatments, and the remaining $N - 2n$ patients are given the treatment designated as better in the testing phase. Under various assumptions about the underlying distributions, Colton has derived optimal fixed and sequential rules for calculating the optimal value of n . Zelen [16] considered a more specialized version of the Colton model, in which the response was assumed to be dichotomous rather than continuous. The new and interesting feature of Zelen's work was the suggestion that the sampling technique could be adapted to reduce the number of patients on the poorer treatment. Zelen applied

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