

AN ADAPTIVE DESIGN FOR MAXIMIZATION OF A CONTINGENT BINARY RESPONSE

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Abstract

Treatment at dose x may be toxic or non-toxic, and if it is non-toxic it may or may not result in cure. We wish to maximize the probability of a cure. A class of adaptive sequential designs for a family of parametric models is proposed. The designs are constructed so that the information in previous trials is used to determine the dose level for the next trial. Criteria for the existence of a maximum for the probability of a cure are given. After calculating the maximum likelihood estimates for the model parameters, the next dose level is chosen to be the level for which the estimated probability of a cure is maximized. Necessary and sufficient conditions for the existence of maximum likelihood estimators are given. The sequential dose levels turn out to be consistent and asymptotically optimal under certain conditions.

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