Constructing better confidence bounds in the dose finding study: A new α-splitting procedure

杜宜軒

Dept. of Biostatistics, Columbia University, USA

Abstract

We consider dose finding studies in which several doses are compared against a control group in terms of some efficacy measurements. The objectives of such studies are usually two-fold: (1) to identify the minimum dose that is effective when compared to the control; and (2), to obtain unbiased estimation of efficacy at the minimum effective dose relative to that at the control. While there is a rich statistical literature of multiple comparisons in the many-to-one situations, existing methods do not accommodate both objectives. In this paper, we propose a simple α-splitting approach to construct confidence bounds at effective doses. We present a specific procedure that extends a method (called DR method) discussed in Hsu and Berger (1999). Through simulations and examinations of several data sets, we find that our method gives a more precise confidence bounds at the effective doses than the DR method, while maintaining similar power in terms of the selection of effective doses. We generalized the theory to accommodate situation where subject heterogeneity is modeled via linear regression.