

Nonparametric analysis of clustered data in diagnostic trials

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Abstract

Diagnostic trials are important in medical research. Statistical methods and models for the analysis of such trials are directly needed. In particular, diagnostic trials with multiple readers and methods are required by Guidelines or Notes for guidance from regulatory authorities.

Clustered data are obtained in these designs when several parts of the same patient are observed at a time where no, several, or all parts may be diseased or non-diseased as classified by a gold standard. This means that rather complicated correlation structures may appear.

Werner and Brunner(2007) discuss nonparametric methods for clustered data in multiple reader studies where a new approach is developed to analyze such complex designs. The disadvantage of the proposed procedures is, that the test statistic (a quadratic form) can become negative if certain conditions on sample sizes are not fulfilled.

In this presentation I will propose a new method to overcome this disadvantage. In a simulation study, the results are compared with those obtained by the Werner-Brunner method.

Keywords

AUC, ROC curve, Multivariate nonparametric Behrens-Fisher problem, ANOVA- type statistic, Multi-reader design, Multi modality design.

References

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