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Compare bayesian evaluation of biomarkers as surrogate endpoints with the frequency form

Shohreh Jalaie[1], Soghrat Faghihzadeh[2], Farzad Eskandari[3] and M.Reza Meshkani[4]

[1]Tehran University of Medical Sciences, Iran

[2]Tarbiat Modares University, Iran

[3]Allameh Tabatabai University, Iran

[4]Shahid Beheshti University, Iran

In medical and pharmaceutical research, interest in using biomarkers as surrogate endpoints for target clinical endpoint has stemmed from various reasons. Because of importance of statistical evaluation of surrogate marker, very different methods are suggested.

Alonso et al. proposed the "likelihood reduction factor" (LRF) as a unified approach when neither the biomarker nor the true endpoint is normally distributed. This measure of individual-level association can be used under any generalized linear model for a single trial or meta-analysis.

Flowing of these criteria for surrogate evaluation, in this study, we have explored the Bayesian approach to the evaluation of the validity of a surrogate at the individual level, based on the Bayes factor for choosing the best model in the context of generalized linear modeling.

It is suggested that the Bayesian LRF denoted by LRFB which benefits from the prior knowledge on the situation under study would perform yet better in comparison to other criteria.

By a Theorem we proof, for large sample size, $\lim LRF_B = LRF$. The relation between the Bayesian likelihood reduction factor (LRF_B) and its frequentist counterpart (LRF) have been shown by a small scale simulation also.

We have simulated different trials with different priors in the logistic regression models by R software. The results show that LRF can be viewed as a special case of LRFB relative to a certain prior. Hence, the importance of prior knowledge and Bayesian analysis for surrogate's validation is shown.

Biography

Shohreh Jalaie has completed her Ph.D in Biostatistics from Tarbiat Modares University in 2008. She passed a scholarship in Melbourne University. She is faculty member of Tehran University of Medical Science. She has published more than 20 papers in reputed journals.