

Transition probabilities and tests to compare treatments with longitudinal binary data

Idemauro Antonio R. de Lara¹, Clarice Garcia B. Demetrio¹, Dalton Francisco de Andrade²
and Juvencio Santos Nobre³

¹ Department of Exact Sciences, University of Sao Paulo, Brazil

² Department of Informatics and Statistics, Federal University of Santa Catarina, Brazil

³ Department of Statistics and Applied Mathematics, Federal University of Ceara, Brazil

Longitudinal binary data are quite common in many applications in which there is an interest in registering the occurrence of a particular event. Generalized linear transition models constitute themselves in a class of models suitable for analyzing these type of data, allowing the modelling of the dependence between repeated observations. Such models are based on stochastic processes and the main aim is to model the probabilities of change or transitions of individual response categories in time. The most considered assumption in these processes is the Markov property, in which the response in one occasion depends on the immediately preceding response. The maximum likelihood approach is used in order to fit the models and estimate the probabilities. When the transition probabilities are homogeneous in time, the Markov processes is considered stationary. Independently of the processes to be considered stationary or not, a question of practical interest is to compare the different treatments using from the matrices of the transition probabilities. In this context, we present asymptotic tests based on odds ratio and on the differences of transition probabilities. The methods are illustrated with respiratory disease data. For these data, the process is stationary of order two and the suggested test points to a significant statistical difference in favor of the active treatment.