

BAYESIAN ANALYSIS FOR LONGITUDINAL COUNTING DATA IN THE PRESENCE OF A COVARIATE CONSIDERING SPATIOTEMPORAL EFFECT

Helton Graziadei de CARVALHO¹
Jorge Alberto ACHCAR²

- **ABSTRACT:** In this paper, we present a Poisson regression analysis with random effects considering longitudinal counting data. We consider a intentional homicides data set in Sao Paulo's state. The homicides were recorded in each region of the state from 2007 to 2012 (quarterly). Therefore, it is likely to exist a correlation between samples from the same region, which is captured through the incorporation of a random effect in the model. The dataset suggest a spatial pattern and perhaps a correlation between border regions. First, we analyze the dataset assuming that the random effects are independent and normally distributed. In the second model, we assume a conditionally autoregressive structure for the random effect. The estimation procedure and inferences are based using Markov Chain Monte Carlo (MCMC). We propose empirical methods to select the best model. ct the best model.
- **KEYWORDS:** Longitudinal counting data; hierarchical Bayesian analysis; conditionally autoregressive model (CAR); "frailty models".

¹Universidade de São Paulo - USP, Instituto de Matemática e Estatística, Departamento de Estatística, CEP: 05508-090, São Paulo,

São Paulo, Brasil. E-mail: *heltongc@ime.usp.br*

²Universidade de São Paulo - USP, Faculdade de Medicina de Ribeirão Preto, Departamento de Medicina Social, CEP: 14049-900, Ribeirão Preto, São Paulo, Brasil. E-mail: *achcar@fmrp.usp.br*