

Use of the Brazilian Model of Climate and Health (BMCH) in order to estimate admissions for respiratory diseases in Brazil

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The early awareness of meteorological conditions may help society avoid waste and damage to human and material resources. Therefore, the aim of this study is to develop a stochastic model to predict respiratory diseases admissions upon meteorological variables. A set of nine years of daily data from the following seven Brazilian capitals was used in the research: Porto Alegre, Florianópolis, Curitiba (Southern Brazil), São Paulo, Belo Horizonte, Vitória (Southeastern Brazil), Brasília (Center-western Brazil). Admissions information was provided by the Brazilian Health Ministry, and meteorological data came from the Brazilian National Institute of Meteorology. The relevant meteorological variables which better explained LRDS admissions were selected through the “stepwise” technique. On the one hand, the results indicated that, in Brazilian southern and southwestern cities, admissions are related to the lowest temperature of three days before. On the other hand, center-western admissions are related to the minimum temperature of the same day or the day before. Upon this information, the Poisson regression was used with the purpose to work out equations able to foretell admissions as well as the relative risk per LRDS, for the seven Brazilian cities. From these equations it became possible to predict LRDA admissions based on the forecast of lowest temperatures, which are generated by the mathematical model of the Brazilian National Institute of Meteorology, named Brazilian Model of High Resolution. With such methodology it was possible to create a model to foretell admissions according to meteorological variables, named “Brazilian Model of Climate and Health” (BMCH).

The results showed that MBCS was capable of accurately predicting the following cities: Porto Alegre, Florianópolis, São Paulo and Brasília with precision of 0.70, 0.64, 0.65 e 0.72, respectively. In regarding to Curitiba, Belo Horizonte and Vitória, MBCS average accuracies were of 0.34, 0.32 and 0.25, respectively. These results indicate that this model can be used as an admission forecasting tool, contributing on the public and media decisions, avoiding financial and human unnecessary wastes.

Key-words: Poisson regression, respiratory diseases, meteorology variables.