

### **Spatial-Longitudinal Model Applied to Leptospirosis Incidence**

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Leptospirosis is an infectious disease of global importance, which has emerged to be an urban health problem due to rodent-borne transmission in urban slums. The major risk factors are poor sanitation, poor housing and flooding which facilitate exposure of slum residents to environments contaminated with rat urine. To estimate individual and environment factors associated with infection, a prospective community-based study was conducted of a cohort of 2,003 slum residents from Salvador, Brazil. Five annual serosurveys were conducted to identify seroconversion, as a measure of infection, among the cohort. To analyse the seroconversion (new infections and reinfection), including the dependence structure of households (all adults in each household were included), and to explore the spatial distribution of infected individuals, models with random effects for individuals and households and a smoothing term for the place of residence were fitted. The inclusion of covariates for environmental exposures, such as proximity of sewerage system and altitude from the bottom of the valley reduced the spatial component effect. Rain, an important factor, was summarised in one measure. Leptospirosis is expected to become an increasingly important slum health problem as predicted global climate change and growth of the world slum population evolves. Models which are adequate to estimate the impact of both environment and climate variables should be incorporated in the epidemiologists toolbox, such that effective community-based interventions can be identified and implemented.