

Stochastic Model of the Dynamics of Chagas Disease in Urban Scenarios

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Chagas disease (American Trypanosomiasis) is one of the most significant health problems in Latin America both, for its morbidity/mortality rate, and its difficult control because of the natural transmission through hematophagous triatomine insects. As a consequence of migration waves in recent decades, the infection has considerably expanded from rural endemic areas to urban centers. The incorporation in the cities of infected individuals, most of them asymptomatic and unaware of their infected condition, increases the risk of transmission by congenital or transfusion ways. The so called *urban Chagas*, involving only the human population, is an emerging problem in American, European, Australian and Japanese cities. The objectives of this work were to develop and apply a stochastic model which will allow the researcher to explain the dynamics of the disease in urban scenarios and thus obtain a higher degree of approximation to the real sanitary situation. This model was formulated as a continuous time Markov chain. We deduced a stochastic differential equations system, employing the method of generating functions, using expressions of conditional probabilities. This system provides the expected numbers of individuals in each stage of the disease. Based on official data and, laboratory and clinical information, a simulation was run in Buenos Aires city (Argentina).

Key words: Markov process, generating function, temporal dynamics, expected numbers