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STOCHASTIC MODEL AND SIMULATION OF THE PREVALENCE OF MEASLES

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Abstract

In this work a stochastic differential equation model is developed and investigated for the dynamics of measles epidemic. The model, which is a multidimensional diffusion process, includes susceptible individuals, latent (exposed), infected and removed individuals. The model used in this work was based on the deterministic model developed by Siabouh and Adetunde (2013). The model was modified by introducing vaccination and measles-induced death parameters. The resulting model was transformed into a stochastic differential equation model using the procedure proposed by Allen et al (2008) and solved using the Euler Maruyama method. Real data for the outbreak of measles in Ogunmakin (a rural community in Ogun state) between January and February 2009 (Adeoye et al (2010)) are used for the simulation. The result shows that increased vaccination rate will lead to measles disease reduction and possible extinction while unsupervised or improper treatment for infected persons will cause measles disease epidemic.

Key Words and Phrases : *Stochastic model, Measles, Transition probability, Wiener process.*