

Estimation of economic burden caused by Influenza using an insurance based probabilistic model

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Influenza is a respiratory infection caused by contagious Influenza viruses. Since influenza occurs around the world, it is essential to estimate the economic burden caused by the disease. In this study, burden is conceptually defined as the cost associated with an infected person, which has to be borne by any susceptible. The objective of this study is to estimate such economic burden of influenza and to analyze the economic burden with respect to insurance and epidemic parameters. Weekly Influenza patients in United States from year 2000 to 2017 were obtained from Centers for Disease Control and Prevention web site. The periodicity of the data was analyzed using Fourier analysis and identified that there was a peak for influenza once per year. Consequently, the disease has been modelled year wise using Kermack-McKendrick model and the simulations were accomplished to identify the range of epidemic parameters. The behavior of the economic burden was analyzed annually with respect to time, removal rate and force of interest. The analysis over time revealed that economic burden increases significantly till 25th to 35th week, and then rate of change of economic burden decreases. A positive relationship was identified between economic burden and removal rate and the behavior of economic burden with respect to force of interest has been identified as a function with a peak, reaching its highest point around 0.04 and 0.05.

Keywords: fourier analysis, kermack-McKendrick model, removal rate, force of interest