

Analyzing the Impact of Migration on HIV and AIDS Incidence Cases in Malaysia

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Abstract : The human immunodeficiency virus (HIV) that causes acquired immune deficiency syndrome (AIDS) remains a global cause of morbidity and mortality. It has caused panic since its emergence. Relationships between migration and HIV/AIDS have become complex. In the absence of prospectively designed studies, dynamic mathematical models that take into account the migration movement which will give very useful information. We have explored the utility of mathematical models in understanding transmission dynamics of HIV and AIDS and in assessing the magnitude of how migration has impact on the disease. The model was calibrated to HIV and AIDS incidence data from Malaysia Ministry of Health from the period of 1986 to 2011 using Bayesian analysis with combination of Markov chain Monte Carlo method (MCMC) approach to estimate the model parameters. From the estimated parameters, the estimated basic reproduction number was 22.5812. The rate at which the susceptible individual moved to HIV compartment has the highest sensitivity value which is more significant as compared to the remaining parameters. Thus, the disease becomes unstable. This is a big concern and not good indicator from the public health point of view since the aim is to stabilize the epidemic at the disease-free equilibrium. However, these results suggest that the government as a policy maker should make further efforts to curb illegal activities performed by migrants. It is shown that our models reflect considerably the dynamic behavior of the HIV/AIDS epidemic in Malaysia and eventually could be used strategically for other countries.

Keywords : epidemic model, reproduction number, HIV, MCMC, parameter estimation

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