

# TEMPORAL PATTERNS AND FORECAST OF DENGUE INFECTION IN NORTHEASTERN THAILAND

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**Abstract.** This study aimed to determine temporal patterns and develop a forecasting model for dengue incidence in northeastern Thailand. Reported cases were obtained from the Thailand national surveillance system. The temporal patterns were displayed by plotting monthly rates, the seasonal-trend decomposition procedure based on loess (STL) was performed using R 2.2.1 software, and the trend was assessed using Poisson regression. The forecasting model for dengue incidence was performed in R 2.2.1 and Intercooled Stata 9.2 using the seasonal Autoregressive Integrated Moving Average (ARIMA) model. The model was evaluated by comparing predicted versus actual rates of dengue for 1996 to 2005 and used to forecast monthly rates during January to December 2006. The results reveal that epidemics occurred every two years, with approximately three years per epidemic, and that the next epidemic will take place in 2006 to 2008. It was found that if a month increased, the rate ratio for dengue infection decreased by a factor 0.9919 for overall region and 0.9776 to 0.9984 for individual provinces. The amplitude of the peak, which was evident in June or July, was 11.32 to 88.08 times greater than the rest of the year. The seasonal ARIMA (2, 1, 0) (0, 1, 1)<sup>12</sup> model was model with the best fit for regionwide data of total dengue incidence whereas the models with the best fit varied by province. The forecasted regional monthly rates during January to December 2006 should range from 0.27 to 17.89 per 100,000 population. The peak for 2006 should be much higher than the peak for 2005. The highest peaks in 2006 should be in Loei, Buri Ram, Surin, Nakhon Phanom, and Ubon Ratchathani provinces.

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