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**Ashari.** *Optimal control of a malaria model with asymptomatic class and superinfection.*

We introduce a malaria model with an asymptomatic class in human population, exposed classes in human and vector populations, re-infection of asymptomatic individuals, and incomplete treatment of symptomatic individuals. The model exhibits backward bifurcation generated by two mechanisms; standard incidence and superinfection. Simulations suggest that total prevalence of malaria is the highest if all individuals show symptoms upon infection, but then undergo an incomplete treatment and the lowest when all individuals first move to the symptomatic class then are treated successfully. We study optimal control strategies applied to bed-net use and treatment as main tools for reducing the total number of symptomatic and asymptomatic individuals. Simulations suggest that the optimal control always leads to decrease in the symptomatic infectious individuals, but may lead to increase in the number of asymptomatic infectious individuals. This last scenario occurs if a large portion of newly infected individuals move to the symptomatic class but many of them do not complete treatment. (Received July 15, 2017)