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Folashade B Augusto* (fbagusto@gmail.com), Department of Mathematics and Statistics,
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Prevalence.*

Malaria infection continues to be a major problem in many parts of the world including the Americas, Asia, and Africa. Insecticide treated bed-nets have shown to reduce malaria cases by 50%; however, improper handling and human behavior can diminish their effectiveness. We formulate and analyze a mathematical model that considers the transmission dynamics of malaria infection in mosquito and human populations and investigate the impact of bed-nets on its control. The effective reproduction number is derived and existence of backward bifurcation is presented. The backward bifurcation implies that the reduction of \mathcal{R} below unity alone is not enough to eradicate malaria, except when the initial cases of infection in both populations are small. Our analysis demonstrate that bed-net usage has a positive impact in reducing the reproduction number \mathcal{R} . The results show that if 75% of the population were to use bed-nets, malaria could be eliminated. We conclude that more data on the impact of human and mosquito behavior on malaria spread is needed to develop more realistic models and better predictions. (Received August 06, 2013)