1077-92-2663 **Calistus Ngeh Ngonghala*** (cnngonghala@nimbios.org), NIMBioS, 1534 White Ave., Suite 400, University of Tennessee, Knoxville, TN 37996-1527. *Hopf and backward bifurcations in a new model for the dynamics of malaria transmission.*

A model for malaria that incorporates mosquito demography is developed and studied. The model differs from standard models in that the mosquitoes involved in disease transmission; i.e., adult female mosquitoes questing for human blood are identified and accounted for. We showed that the system can be driven to instability via a Hopf bifurcation. The model therefore captures natural oscillations known to exist in malaria prevalence without recourse to external seasonal forcing and/or delays. Besides the basic reproduction number, which is shown to be smaller than that for previous models, we identified a second threshold parameter that is associated with mosquito demography. These two threshold parameters can be used for purposes of disease control. The model also exhibits a backward bifurcation. Hence, simply reducing the basic reproduction number below unity may not be enough for disease eradication. The discovery of oscillatory dynamics and a backward bifurcation presents a novel and plausible framework for developing and implementing control strategies. Thus, accounting for mosquito demography is important in explaining observed patterns in malaria prevalence, as well as in designing and evaluating control strategies, especially strategies that are related to mosquito control. (Received September 22, 2011)