

# On a Seasonally Responsive Malaria Model.

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*Keywords: Malaria model, Bifurcation, Basic Reproduction Number, Seasonality* Entomological studies suggest that mosquito population is a function of time and rainfall in areas where malaria disease is hyperendemic. In this research work we propose a mathematical model to capture this phenomenon. A malaria disease transmission model is formulated and studied. The epidemic threshold parameter which is generally known as the basic reproduction number and usually denoted by  $R_0$  is obtained. The existence of equilibria is considered. We use the Center Manifold Theory to show the possibility of occurrence of a Backward Bifurcation at  $R_0 = 1$  [1]. Finally our model is modified to incorporate the seasonal response of the mosquito population, and the model equivalent of the basic reproduction number is determined.

## References

- [1] C. Castillo-Chavez and B. Song (2004). Dynamical model of tuberculosis and their applications. *Math. Biosci. Eng.* **1**(2): 361-404.