Modelling the Effects of Temperature Variation on Schistosomiasis Transmission Dynamics

Josephine Wairimu Kagunda[1], Theresia Marijani[2], Gerald Mligo[2], Marily Rono[1]
[1] University of Nairobi, Kenya
[2] University of Dar es Salam, Tanzania

Keywords: Schistosomiasis, miracidia; cecaria, bifurcation, stability analysis, sensistivity analysis.

Schistosomiasis ranks second behind malaria in terms of its social, economic and public health impact in tropical and subtropical regions of the world. In this study, a non-linear mathematical model is formulated to study the effects of temperature variation on schistosomiasis transmission in the population. We hypothesize that changes in climatic variables as a result of global climate change will cause changes in the epidemiology of infectious diseases, schistomiasis included. The ability of mankind to understand, react or adapt is dependent upon the magnitude and speed of the change. The outcome will also depend on our ability to recognize epidemics early, contain them effectively, provide appropriate treatment, and commit resources for prevention and research. That can only happen if the effect on a particular disease can be measured and analyzed. In this study we incorporate such changes to determ- ine the best strategy to tackle schistosomiasis threat in light of climatic variables variation.

References

[1] Anderson R and May R, *Prevalence of Schistosome Infections Within Molluscan Populations Observed Patterns and Theoretical Predictions*, Parasitology **79** 63–94.

[2] Birkhoff G and Rota GC, Ordinary Differential Equations, Wiley, 1962

[3] Diekmann O and Heesterbeek JAP, *On the Definition and Computation of the Basic Reproduction Ratio Ro in the Model of Infectious Disease in Heterogeneous Populations*, J. Math. Biol. **2(1)** 265–382.

[4] Coelho J and Bezerra F, *The Effect of Temperature Changes on the Infection Rate of Biom phalaria glabrata with mansoni*, Mem. Inst. Oswaldo Cruz **101** 223–224.