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A reaction-diffusion malaria model with seasonality and incubation period

In this talk, I will consider a time-periodic reaction-diffusion model which incorporates seasonality, spatial heterogeneity and the extrinsic incubation period (EIP) of the parasite. The basic reproduction number R_0 is derived, and it is shown that the disease-free periodic solution is globally attractive if $R_0 < 1$, while there is an endemic periodic solution and the disease is uniformly persistent if $R_0 > 1$. Numerical simulations indicate that prolonging the EIP and increasing population mobility may be helpful in the disease control, while spatial heterogeneity of the disease transmission coefficient may increase the disease burden. This talk is based on a joint work with Drs. Rui Peng and Xiao-qiang Zhao.