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A Climate-Based Malaria Transmission Model with Age-structure

In this talk, we present an age-structured model of malaria transmission. We first introduce the basic reproduction ratio for this model and then show that the disease-free periodic state is globally asymptotically stable when this ratio is less than one, and there exists at least one positive periodic state and the disease persists when it is greater than one. We further use these analytic results to study the malaria transmission cases in KwaZulu–Natal Province, South Africa, to determine how well they represent the biological system and, consequently, how useful their predictions are. Some sensitivity analysis of the basic reproduction ratio is performed, and in particular, the potential impact of climate change on seasonal transmission and populations at risk of the disease is analyzed.

This is joint work with Yijun Lou.