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Dynamics of a cholera transmission model: from Microscopic Cycles to Macroscopic Cycles

Cholera remains epidemic and endemic in the world, causing thousands of deaths annually in locations lacking adequate sanitation and water infrastructure. Yet, its dynamics are still not fully understood. In this talk, I will present a cholera transmission model that includes the dynamics of bacteriophage and bacteria (*V. cholerae*), and also contains an indirect infection term which accounts for a minimum infectious dose of the bacteria. Using this model, I determine what drives cyclical outbreaks of cholera in endemic regions and suggest ways by which such outbreaks can be prevented. In addition, I will present a region in the parameter space of our model that leads to chaotic behaviour. This could be used to explain the irregularity in the seasonal patterns of outbreaks amongst different countries, especially if the positive relationship between bacterial proliferation and temperature is considered.