

WORKSHOP
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Ecology of Infectious Diseases: Cholera as a Case Study

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Abstract

Population models for the spread of infectious disease can be considered as a special case of dynamical modelling of ecosystems. The large quantity, quality and length of human disease reports have long made infectious diseases a model system for relating theories of mathematical ecology to time series data. Several factors have recently energized the quest to build on this historical relationship between ecology and epidemiology. Re-emerging diseases have revealed the limitations of the effectiveness of medical treatment and vaccination strategies in the face of drug resistance, genetic shift and poor medical infrastructure in affected regions. Newly emerging infectious diseases, often endemic animal diseases which cross over to humans, pose a significant public health threat which motivates studying the dynamics of the disease in the animal population. Anthropogenic change in land use, climate and biodiversity has many potential public health impacts which are perhaps best assessed via retrospective studies of the dynamic relationship between climate and disease prevalence. Cholera provides an example of a major global disease which has proven resistant to vaccination. The pathogen, *Vibrio cholerae*, can flourish in warm brackish estuaries. Analysis of time series data via mechanistic models has led to several insights into the epidemiology of the disease and its relationship with climate. Some fundamental questions remain.