**Models for Disease Dynamics**

Ecologists and epidemiologists have developed a wide array of models to describe the spatial and/or temporal dynamics of disease.

1. Classify these existing models into 3-5 major categories. Describe each category in 1-2 paragraphs, then develop a specific example of how this category of model has been applied to a particular disease system. For each category, try to convey the potential strengths and weaknesses of the approach. Also, as you work through the categories and examples, try to use a diversity of disease systems to convey the breadth of your understanding of the field (note: do not use cholera - see part 2). We are not looking for an exhaustive review here, but rather a creative synthesis of extant models combined with informative examples of how each type of model has been used in the past.

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2. Describe the major models that have been, or are being, developed to describe the dynamics of Vibrio cholerae and/or cholera outbreaks. Once you have described the models, make specific comparisons between (a) predictive, mechanistic models and (b) empirical, descriptive models, and the potential pros and cons of each approach. For what situation(s) is each type of model likely to be most appropriate, and why? Evaluate the overall cholera modeling effort to date. Where does it fall short in providing useful predictive and/or heuristic tools? Describe a model(s) that would address one or more of these shortcomings.

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