Modeling Infectious Diseases: Two Strain Diseases in Metapopulations

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Infectious diseases often mutate and are carried between regions. We consider a mathematical model which begins to account for these factors. We assume two disjoint populations that only occasionally come into contact, and two strains of a disease present in these populations. Of interest are the equations describing the dynamics of this system, the conditions under which epidemics will occur, and the long term behavior of the system under various initial conditions. We find that in many ways this system is similar to a simpler one-population model. However, we find evidence that there may be conditions under which both disease strains can coexist, other than the expected case where both strains are of equal strength.

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