

Vector-borne diseases in urban environments: A metapopulation perspective

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Abstract

We consider a metapopulation model for an arboviral disease dynamics within a urban environment. The underlying dynamics is a coupled SIR (human)/SI (mosquito) system; notification districts are taken for patches. We focus on the role of human movement in sustaining the epidemics, and this lead us to consider a fast commuting limit. The limiting model belongs to a class of multigroup models that can be complete analysed for the long-term dynamics [1].

It turns out that considering different aspects of urban districts leads to very heterogeneous networks, which might lead to very distinctive dynamics. In a worst case scenario, one might have local basic reproduction numbers all less than unity, but with the network basic reproduction number (R_0) larger than one [2].

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Keywords: multigroup models , vector-borne diseases, Lyapunov functions, colored multi-graphs

References

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