Cholera Transmission Dynamics between Communities Linked by Migration

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A metapopulation model describing cholera transmission between two communities linked migration was developed and analysed. Disease threshold ratios specific to communities were determined as well as the disease equilibrium points in presence and absence of migration. Sensitivity analysis of the disease thresholds to model parameters was performed using the Latin hypercube sampling scheme to determine the most important parameters to be targeted if the infection is to be contained. The model results were as follows; (1) movement between communities worsens the epidemic even in the initially less affected community; (2) unrestricted movement during the time of the epidemic is characterised by synchronous fluctuation of the populations in the adjacent communities; and (3) cholera epidemic is characterised by an explosive outbreak followed by a self limiting phase. Owing to the significance of movement of individuals in spurring the epidemic, it is recommended that movement to and fro affected communities should be regulated in times of an epidemic.

References

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