

## **A Network-Patch Model for Mosquito-borne Pathogens**

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We derive new network-patch model for mosquito dynamics and pathogen transmission that couples to agent-based spatial models for the spread of mosquito-borne diseases. The model accounts for environmental factors, such as rainfall and temperature, and variations in mosquito-related parameters, including the emergence rates and incubation period of the pathogen. Our simulations quantify the importance of heterogeneity in predicting the spread of vector-borne diseases.