

Modeling the Role of Land Conversion on the Spread of an Epizootic Disease

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Land conversion and the resulting contact between domesticated and wild species has arguably been the single largest contributor to the emergence of novel epizootic and zoonotic diseases in the past century. An unintended consequence of these interactions is zoonotic or epizootic disease spillovers from wild species to humans and their domesticates. Disease spillovers are edge effects of land conversion and are sensitive to the size and shape of converted areas. We combine spatial metrics from landscape ecology with theoretical epidemiological models to understand how the size and shape of land conversion affect epizootic and zoonotic disease transmission of single and two species populations. We show that the less compact the converted area, and the the greater the depth of the contact zone, the more rapidly will an introduced disease spread through the domesticated population.