Preliminary Study on the Development of a Transmission Model for Canine Distemper Virus in Wildlife Populations Using Heat Mapping and the Basic Reproduction Number

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Abstract

Canine Distemper Virus (CDV) is a highly contagious disease that affects a wide range of wildlife species, posing a serious threat to biodiversity and conservation efforts. Despite its ecological significance, the transmission dynamics of CDV in wildlife remain poorly understood, especially in tropical ecosystems. One of the main challenges in studying CDV transmission is the lack of reliable epidemiological data and the difficulty in capturing and monitoring wild animals for surveillance purposes. Thus, this study aims to develop a model to estimate the potential transmission of CDV in wildlife populations using spatial heat mapping and the basic reproduction number (R_o) as key indicators. A combination of field observation records, environmental data, and reported CDV cases

were used to generate predictive heat maps and simulate disease spread across susceptible wildlife hosts. Results showed that certain environmental factors and animal density hotspots significantly contribute to higher transmission potential of CDV. Preliminary results suggest that high-risk zones can be identified based on overlapping wildlife movement corridors and human interface areas. This modeling approach offers a valuable tool to guide targeted monitoring, early detection and conservation strategies against CDV outbreaks in wildlife. © 2026 by the authors.

Author keywords

basic reproductive number; CDV; conservation; transmission; wildlife

Indexed keywords

EMTREE medical terms

Article; basic reproduction number; biodiversity; Canine distemper virus; disease transmission; ecosystem; environmental factor; habitat; heat; human settlement; microparasite; nonhuman; population density; rain forest; satellite imagery; Tupaia glis; virus transmission; wild animal; wildlife

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