

Impacts of anthropogenic change on biodiversity affect disease spillover risk

Caroline K Glidden^{1,2}, Nicole Nova^{1,2}, Morgan P Kain^{1,3}, Katherine M Lagerstrom¹, Eloise B Skinner^{1,4}, Lisa Mandle^{1,3,5}, Susanne H Sokolow^{1,5,6}, Raina K Plowright⁷, Rodolfo Dirzo^{1,5}, Giulio A De Leo^{1,5,6}, and Erin A Mordecai^{1,5}

¹Department of Biology, Stanford University

²Contributed equally

³Natural Capital Project, Stanford University

⁴Centre for Planetary Health and Food Security Griffith University

⁵Woods Institute for the Environment, Stanford University

⁶Hopkins Marine Station, Stanford University

⁷Department of Microbiology and Immunology, Montana State University

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Abstract

The integration of biodiversity conservation and public health has gained significant traction, leading to new efforts to identify win-win solutions for sustainable development and health. At the forefront of these efforts is pinpointing ways that biodiversity conservation can reduce risk of zoonotic spillover, especially given the consequences of pandemics and epidemics of wild animal origin. However, there is currently an incomplete understanding of the mechanisms by which biodiversity change influences the spillover process, limiting the application of integrated strategies aimed at achieving positive outcomes for both conservation and disease management. One limitation has been a narrow focus on the relationship between infectious disease and species richness only, thus missing other relevant dimensions of biodiversity. Here, we review the literature, considering a broad scope of biodiversity definitions, to identify cases where zoonotic pathogen spillover is mechanistically linked to changes in biodiversity. Extending biodiversity to include other dimensions of it, such as functional diversity, landscape diversity, spatiotemporal diversity, and interaction diversity, allows us to identify potential relationships between biodiversity change and zoonotic spillover. By reframing the discussion of biodiversity and disease using mechanistic evidence while encompassing multiple dimensions of biodiversity, we work toward general principles that can guide future research and more effectively integrate the related goals of biodiversity conservation and spillover prevention.

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