Another pandemic coming? Expanding land use boosts exposure to diverse zoonotic diseases, study finds

Land use change—for example, the conversion of natural habitats to agricultural or urban ecosystems—is widely recognized to influence the risk and emergence of zoonotic disease in humans. However, whether such changes in risk are underpinned by predictable ecological changes remains unclear. It has been suggested that habitat disturbance might cause predictable changes in the local diversity and taxonomic composition of potential reservoir hosts, owing to systematic, trait-mediated differences in species resilience to human pressures.

Here we analyze 6,801 ecological assemblages and 376 host species worldwide, controlling for research effort, and show that land use has global and systematic effects on local zoonotic host communities. Known wildlife hosts of human-shared pathogens and parasites overall comprise a greater proportion of local species richness (18–72% higher) and total abundance (21–144% higher) in sites under substantial human use (secondary, agricultural and urban ecosystems) compared with nearby undisturbed habitats.

The magnitude of this effect varies taxonomically and is strongest for rodent, bat and passerine bird zoonotic host species, which may be one factor that underpins the global importance of these taxa as zoonotic reservoirs. We further show that mammal species that harbor more pathogens overall (either human-shared or non-human-shared) are more likely to occur in human-managed ecosystems, suggesting that these trends may be mediated by ecological or life-history traits that influence both host status and tolerance to human disturbance.

Our results suggest that global changes in the mode and the intensity of land use are creating expanding hazardous interfaces between people, livestock and wildlife reservoirs of zoonotic disease.

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