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Unveiling the Impact of Living Environments on Infectious Disease Risk

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The rise in disease prevalence reflects climatic changes and modifications in human behavior and habitats, such as those associated with urbanization. Considering human behavior, the improved sanitation and vector control and the reduced domestic-wild animal contact associated with the movement to urban living are predicted to decrease disease risk. In contrast, increased population densities and extensive antibiotic use that can contribute to the emergence and dissemination of anti-microbial resistance (AMR) may have opposite effects. Finally, urbanization is often associated with microclimatic changes, which may influence disease risk by affecting vector densities. These different factors may interact in complex ways that can influence reservoir and vector infection rates and select for AMR, which are jointly expected to impact human disease risk. However, presently, we lack a full understanding of the individual effects of these changes, and there is a notable lack of studies that combine them to grasp their collective impact.

Using wild rodents and related vectors in southern Israel as a case study, we set two main objectives:

- 1) Assess the community structure of rodents and their fleas, ticks, and corresponding pathobiomes (pathogen communities across sample types), and resistomes (the collection of AMR genes across sample types) in Bedouin and Jewish residencies of different characteristics.
- 2) Identify specific factors associated with harboring Rickettsiae, Coxiella, Leptospira, and AMR genes.