IJTMGH
International Journal of Travel Medicine and Global Health

Int J Travel Med Glob Health. 2026 Jun;14(2)
http://ijtmgh.com

Editorial Open Access

Host Immunity and Emerging Infectious Diseases in the Era of Global Travel

Hadi Esmaeili Gouvarchinghaleh[1]

[1] Executive Manager, Associate Professor of Immunology, Applied Virology Research Center, Biomedicine Technologies Institute, Baqiyatallah University of Medical Sciences

Introduction

The unprecedented growth of international travel over the past decades has fundamentally reshaped the epidemiology of infectious diseases. Millions of people across international borders daily for tourism, business, migration, and humanitarian activities. While global mobility offers enormous economic and cultural benefits, it also facilitates the rapid spread of pathogens across geographic regions. In this context, understanding host immunity has become increasingly important for travel medicine and global health preparedness.

Emerging and re-emerging infectious diseases remain a major challenge in an interconnected world. Pathogens such as SARS-CoV-2, Zika virus, dengue virus, and various influenza strains have demonstrated how quickly infections can spread through international travel networks. Travelers may serve as both recipients and carriers of infectious agents, transporting pathogens from endemic areas to regions where population immunity may be limited. Consequently, the interaction between host immune responses and pathogen exposure plays a critical role in determining disease susceptibility, transmission dynamics, and clinical outcomes.

Host immunity is influenced by several factors, including prior pathogen exposure, vaccination history, genetic background, age, nutritional status, and underlying medical conditions. Travelers often encounter unfamiliar microbial environments, exposing their immune systems to pathogens for which they have little or no preexisting immunity. This immunological gap increases the risk of infection and may lead to atypical or more severe clinical manifestations. Moreover, immunocompromised individuals, including patients receiving immunosuppressive therapies or living with chronic diseases, may face even greater risks when traveling to regions with endemic infectious diseases.

Vaccination remains one of the most effective strategies for strengthening host immunity against travel-related infections. Pre-travel immunization programs targeting diseases such as yellow fever, hepatitis A, typhoid fever, and meningococcal infections have significantly reduced the burden of preventable illnesses among travelers. However, emerging pathogens and evolving viral variants continue to challenge existing vaccination strategies. The development of next-generation vaccines, improved immunization policies, and personalized risk assessment based on travelers' immunological status are increasingly important components of modern travel medicine.

In addition to vaccination, advances in immunology are providing valuable insights into host–pathogen interactions. Research on innate immune responses, mucosal immunity, and immunological memory is helping to clarify why individuals respond differently to the same pathogen exposure. Understanding these mechanisms may support the development of innovative preventive measures, including immunomodulatory therapies and improved vaccine platforms designed to enhance protective immunity in diverse populations.

Global health systems must also recognize the importance of immune surveillance and cross-border collaboration. Monitoring immune responses at the population level, particularly in regions with high traveler mobility, may help identify vulnerable groups and guide targeted interventions. Integrating immunological data with epidemiological surveillance can improve early detection of emerging infectious threats and strengthen preparedness strategies.

In the era of global travel, infectious diseases can no longer be viewed as isolated regional problems. Instead, they represent shared challenges that require coordinated international responses. Strengthening host

immunity through vaccination, research, and public health collaboration will remain essential for mitigating the impact of emerging infections. As travel continues to expand, integrating immunological insights into travel medicine policies will be crucial for protecting both travelers and global communities from future infectious threats.

Reference

1. Aghayan SK. Moghadas hosseinzadeh F. The impact of traveling on infectious diseases transmission with a focus on air travel: A Narrative Review. Int. J. Travel. Med. Glob. Health. 2025;13:33-41.

2. De Gaetano S, Ponzo E, Midiri A, Mancuso G, Filippone D, Infortuna G, Zummo S, Biondo C. Global trends and action items for the prevention and control of emerging and re-emerging infectious diseases. Hygiene. 2025 May 2;5(2):18.

3. Mitchell EP, Pathirannehalage SC. Eradicating infectious disease: Can we and should we: A critical examination. IJID One Health. 2025 Dec 1;9:100088.