

# The Spread of Emerging Infectious Diseases: Challenges and Control Strategies

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Dear Editor

Emerging infectious diseases (EIDs) have become a pressing global concern, with outbreaks such as Ebola, Zika, and COVID-19 underscoring the vulnerabilities in public health systems worldwide (1). This letter aims to provide a concise overview of the persistent challenges in controlling EIDs, while offering context-specific insights and proposing actionable strategies.

Rationale for writing this letter: The rationale for writing this letter stems from the urgent need to revisit these challenges in light of recent global experiences and to highlight national-level considerations that are often underrepresented in broader discussions. In particular, the lessons learned from country-specific responses such as Iran's experience can inform more adaptive and resilient public health strategies. By sharing these insights, the letter contributes to a more nuanced understanding of how global frameworks must be localized to be effective.

## Rationale and National Considerations

While the global nature of EIDs is well-documented, national-level responses vary significantly (2).

National considerations in detail: For instance, Iran's experience during the COVID-19 pandemic revealed critical gaps in surveillance infrastructure, public communication, and resource allocation (1). The lack of integrated data systems and delayed policy responses exacerbated the spread of the virus (3). Additionally, geopolitical factors such as international sanctions hindered access to medical supplies and vaccines, further complicating outbreak management. Iran's national action plan on antimicrobial resistance (AMR), launched in 2018, remains under-implemented due to resource limitations and fragmented governance (4). These examples illustrate how national contexts including political, economic, and infrastructural realities must be factored into any effective disease control strategy. By examining such national contexts, we can better understand how global strategies must be adapted to local realities (5).

## Key Challenges in Controlling Emerging Infectious Diseases

### Globalization and Increased Mobility

Although widely acknowledged, the implications of globalization continue to evolve. For example, the rise of informal cross-border trade and undocumented migration in regions such as the Middle East and North Africa (MENA) complicates disease tracking and containment (6). These dynamics call for more nuanced surveillance approaches that account for informal mobility patterns(7).

### Weak Health Systems

Beyond infrastructure, weak governance and fragmented health policies contribute to systemic vulnerabilities (3). In Iran, for example, sanctions have limited access to essential medical supplies, affecting outbreak response capacity. Strengthening health systems must therefore include policy reform, investment in workforce development, and international cooperation to mitigate geopolitical constraints (8).

### Resistance to Treatment

Antimicrobial resistance (AMR) is a growing concern, particularly in countries with high rates of antibiotic misuse (9). National campaigns to regulate antibiotic prescriptions and promote public awareness have shown promise but require sustained funding and political commitment (4). As mentioned earlier, Iran's national action plan on AMR, which was initiated in 2018, has not been fully implemented due to limitations in available resources (8).

### Strategies for Effective Control

#### 1. Incorporating Case Studies and Data-Driven Approaches

To enhance the relevance of control strategies, integrating national case studies such as Iran's COVID-19 response or Egypt's handling of H5N1 can offer practical lessons. Data-driven modeling of outbreak scenarios can also inform resource allocation and policy decisions (3, 10).

#### 2. Strengthening Global and Local Surveillance Systems

Surveillance must be both globally coordinated and locally responsive. Establishing regional centers of excellence, improving laboratory capacity, and

training epidemiologists are essential steps (9). Iran's collaboration with WHO on influenza surveillance is an example of successful regional integration (3, 4, 9).

### 3. Community Engagement and Risk Communication

Public trust is crucial in outbreak management (8). Transparent communication, culturally sensitive messaging, and community-based interventions can significantly improve compliance with health measures (11).

### Conclusion

While the challenges posed by Emerging Infectious Diseases (EIDs) are longstanding, their evolving manifestations and impacts demand renewed attention. By integrating national perspectives, leveraging data-driven insights, and examining practical case studies, we can transcend broad generalizations and foster more nuanced, effective approaches to infectious disease control. This letter seeks to spark deeper dialogue and promote targeted research and policy development tailored to specific contexts and needs.

### Footnotes

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## References

1. Excler J-L, Saville M, Berkley S, Kim JH. Vaccine development for emerging infectious diseases. *Nat Med*. 2021;27(4):591-600. <https://doi.org/10.1038/s41591-021-01301-0>. [PMID]
2. Parhizgari N, Gouya MM, Mostafavi E. Emerging and re-emerging infectious diseases in Iran. *Iran J Microbiol*. 2017 Jun;9(3):122. [PMID]
3. Eslamian M, Sorouri S, Mojahed F, Farazi A, Tavanai H, Sadeghi Z, et al. Emerging and re-emerging infectious diseases in Iran: a narrative review of causes, challenges, and policy recommendations. *Health Promot Perspect*. 2025 Jun 1;5(1):125-134. <https://doi.org/10.22034/HP.2025.533176.1070>
4. Yari S, Faraji F. Iran's structure, policies, and actions against the spread of infectious diseases in the contemporary period. *Geopolit Q*. 2021 Apr 21;17(Special Issue):71-89.5.
5. Tuite AR, Bogoch II, Sherbo R, Watts A, Fisman D, Khan K. Estimation of coronavirus disease 2019 (COVID-19) burden and potential for international dissemination of infection from Iran. *Ann Intern Med*. 2020 May 19;172(10):699-701. <https://doi.org/10.7326/M20-0696>. [PMID]
6. Bizri AR, Althaqafi A, Kaabi N, Obeidat N, Musharrafieh U, Sallam M. The burden of invasive vaccine-preventable diseases in adults in the Middle East and North Africa (MENA) region. *Infect Dis Ther*. 2021 Jun;10(2):663-685. <https://doi.org/10.1007/s40121-021-00420-y>. [PMID]
7. Shadomy SV, Ebrahim SH, Guagliardo SA, Kinsman J, Al-Mawali A, Al-Marzooq F, et al. Emerging and re-emerging disease threats in the Middle East and North Africa region—One Health approaches and potential strategies. *Eur J Public Health*. 2025 Jan;35(Suppl\_1):i3-i5. <https://doi.org/10.1093/eurpub/ckae122>. [PMID]
8. Mostafavi E, Ghasemian A, Abdinasir A, Moin V, Shaikh A, Khairy A, et al. Emerging and re-emerging infectious diseases in the WHO Eastern Mediterranean region, 2001-2018. *Int J Health Policy Manag*. 2022 Aug;11(8):1286-1297. <https://doi.org/10.34172/ijhpm.2021.13>. [PMID]
9. Mehtarpour M, Takian A, Eshrati B, Yarahmadi A, Hashemi SM, Akbari Sari A, et al. Control of antimicrobial resistance in Iran: the role of international factors. *BMC Public Health*. 2020 Jun 5;20(1):873. <https://doi.org/10.1186/s12889-020-09006-8>. [PMID]
10. Shesheny R, Kandeil A, Mostafa A, Kayed AS, Shehata MM, Ali MA, et al. H5 influenza viruses in Egypt. *Cold Spring Harb Perspect Med*. 2021 Jun 1;11(6):a038745. [PMID]
11. Mourya DT, Yadav PD, Ullas PT, Bhardwaj SD, Sahay RR, Chadha MS, et al. Emerging/re-emerging viral diseases & new viruses on the Indian horizon. *Indian J Med Res*. 2019 Apr 1;149(4):447-467. [https://doi.org/10.4103/ijmr.IJMR\\_1239\\_18](https://doi.org/10.4103/ijmr.IJMR_1239_18). [PMID]