Emerging global pathogens: Surveillance and one health.

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Introduction

The landscape of infectious diseases is continuously evolving, marked by the emergence of novel pathogens and the re-emergence of previously controlled ones, posing significant global health challenges. Recent findings highlight the isolation of a novel bat-associated reovirus from a human patient in China experiencing acute febrile illness, underscoring the critical zoonotic potential of bat viruses and the urgent need for robust surveillance systems to detect emerging pathogens before they cause widespread human disease[1].

Further complicating the diagnostic landscape, Burkholderia pseudomallei has been reported as an unusual cause of sepsis in a patient residing in a non-endemic region. This case report emphasizes the inherent difficulties in diagnosing melioidosis, particularly in areas where the pathogen is not typically encountered, thereby stressing the importance of thorough travel history collection and the adoption of broad diagnostic approaches[2].

The spectrum of microbial threats also includes a growing array of atypical fungal pathogens. A comprehensive review details the rise of these emerging and re-emerging fungal infections, particularly their disproportionate impact on immunocompromised individuals. This work illuminates the increasing challenges in both diagnosing and treating these opportunistic infections due to their growing diversity and developing drug resistance profiles[3].

Beyond microbial agents, neurodegenerative disorders also present unusual diagnostic complexities. A detailed review of atypical prion diseases explores their diverse clinical, pathological, and genetic features. This review is instrumental in shedding light on the varied presentations of these rare conditions, stressing the importance of recognizing their unique characteristics for accurate diagnosis and for a deeper understanding of their molecular underpinnings[4].

The parasitic realm similarly introduces unusual threats, such as Baylisascaris procyonis. This emerging parasitic pathogen poses a severe risk, with studies outlining its intricate life cycle, epidemiology, and the profound neuropathological consequences observed in human infections. The article highlights the necessity of public health awareness and proactive preventive measures, especially within regions characterized by high raccoon populations, which are primary hosts[5].

The broader context of new viral threats is continuously shaped by lessons derived from recent viral outbreaks and pandemics. A significant review synthesizes critical insights from these events, emphasizing the relentless emergence of new viral threats. It delves into the multifaceted factors that drive pathogen emergence, the inherent challenges associated with achieving rapid response, and the strategic approaches necessary for global preparedness against future viral incursions[6].

Another unusual bacterial pathogen garnering attention is Mycobacterium chimaera. Infections following cardiac surgery, though rare, underscore its global significance. The article discusses the challenges posed by its slow-growing nature in diagnosis and the broad implications for healthcare settings in both preventing and effectively managing these often difficult-to-treat infections[7].

The complex interplay between environmental changes, human activities, and animal reservoirs continues to drive spillover events, mapping the current landscape of emerging zoonotic pathogens. This interaction defines future challenges in disease surveillance, control, and necessitates the adoption of a comprehensive ”One Health” approach to mitigate the risk of future pandemics effectively[8].

Furthermore, ocular infections present their own set of unique pathogens. Acanthamoeba keratitis, an unusual protozoan pathogen, is a notable cause of severe vision loss, predominantly affecting contact lens wearers. The article elaborates on its epidemiology, key risk factors, characteristic clinical presentation, and the diagnostic challenges associated with this frequently misdiagnosed and difficult-to-treat corneal infection[9].

Lastly, the discovery and characterization of a novel Rickettsia species, tentatively named ”Candidatus Rickettsia massiliensis-like,” has been reported in association with human febrile illness in China. This finding significantly expands our understanding of the diversity of rickettsial pathogens and their potential role in causing undiagnosed fevers within endemic regions, calling for further

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Received: 04-Sep-2025, Manuscript No. AABMCR-225; **Editor assigned:** 08-Sep-2025, Pre QC No. AABMCR-225 *(PQ)*; **Reviewed:** 26-Sep-2025, QC No. AABMCR-225; **Revised:** 07-Oct-2025, Manuscript No. AABMCR-225 *(R)*; **Published:** 16-Oct-2025, DOI: 10.35841/ bmcr-9.4.225

Citation: Wei C. Emerging global pathogens: Surveillance and one health. aabmcr. 2025;09(04):225.

research and clinical vigilance[10].

Conclusion

The provided data illuminates a critical aspect of global health: the continuous emergence and re-emergence of diverse and often unusual pathogens. This includes a novel bat-associated reovirus causing febrile illness in China, highlighting zoonotic spillover risks, and new Rickettsia species expanding our understanding of undiagnosed fevers. Beyond viruses, bacterial threats like Burkholderia pseudomallei causing sepsis in non-endemic regions and Mycobacterium chimaera post-cardiac surgery underscore diagnostic complexities, especially given slow-growing characteristics or unusual geographic presentation. Atypical fungal pathogens are increasingly impacting immunocompromised individuals, challenged by growing diversity and drug resistance. Parasitic threats, such as Baylisascaris procyonis, pose severe neuropathological risks, while protozoan agents like Acanthamoeba keratitis cause significant vision loss, particularly in contact lens wearers. Furthermore, comprehensive reviews emphasize lessons from viral pandemics regarding global preparedness, the intricate interplay of environmental factors driving zoonotic emergence, and the unique characteristics of atypical prion diseases requiring specialized diagnosis. Collectively, these studies stress the urgent need for enhanced surveillance, broad diagnostic approaches, public health awareness, and a ”One Health” strategy to effectively mitigate the global impact of these evolving infectious and neurodegenerative threats.

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Citation: *Wei C. Emerging global pathogens: Surveillance and one health. aabmcr. 2025;09(04):225.*