Combating regional outbreaks: One Health strategy integrating reverse microbial aetiology to avert global pandemics

Lancet Microbe 2025;6: 101091
Published Online February 25, 2025
https://doi.org/10.1016/j.lanmic.2025.101091

The recent emergence of an unidentified disease in the Democratic Republic of the Congo has ignited worldwide alarm, with several countries reaching out to the country's health ministry.[1] This situation underscores the fact that in some parts of the African continent, inadequate sanitation has historically led to the proliferation of both ancient and newly emerging diseases, resulting in considerable health crises such as mpox,[2] Ebola virus disease,[3] and Marburg virus disease.[4] Although the spread of these diseases might have been previously contained within limited geographical areas due to Africa's transportation and communication limitations, the swift pace of global economic integration has accelerated the transmission of both ancient and novel infectious diseases.[5]

Some researchers have proposed reverse microbial aetiology,[6] which can play a substantial role in predicting and preventing emerging infectious diseases. Pathogens that can be transmitted from wild or domestic animals to humans, causing disease outbreaks; those that pose a threat to animal health and have a tendency to mutate; and unknown animal pathogens pose the risk of human transmission.[7] Failure to identify the transmission information of these pathogens in advance would make it difficult to take effective countermeasures once an outbreak occurs, leading to large-scale public health events. At the same time, the One Health strategy emphasises the interconnections among human, animal, and environmental health.[8] In terms of responding to emerging infectious diseases, the One Health strategy implies interdisciplinary cooperation, integrating resources and knowledge from fields such as public health, veterinary medicine, and ecology. This strategy helps in the early identification and control of the spread of pathogens, reducing the cross-species transmission of diseases from animals to humans, while also protecting biodiversity. By integrating reverse microbial aetiology, the One Health strategy can enhance the rapid response capacity to outbreaks, reducing the impact of epidemics on both human society and economy.

The control and prevention of diseases are no longer limited to a single country. The world is an integrated entity, and diseases cannot be discriminated based on race or industry. Countries should coordinate with various disease control personnel, including medical professionals, veterinary public health workers, epidemiologists, and government agency staff, for effective collaboration.[9,10] Collaborative and proactive efforts are warranted to curb the emergence of novel infectious diseases or their impact on public health. Such efforts are the only way to truly and effectively prevent the spread of infectious diseases that could affect regions or the entire world.

We declare no competing interests.

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