EDITORIAL

Separating facts from fear and revisiting lessons in preparedness in the context of HMPV

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The recent reports of rising Human Metapneumovirus (HMPV) cases in China have reignited concerns about the global readiness to address respiratory virus outbreaks. Although HMPV has recently garnered significant media attention, it is crucial to avoid being influenced by sensationalized coverage. While HMPV is not new and its spread is largely limited to vulnerable populations, such episodes serve as a timely reminder of the factors influencing pandemic potential and the critical importance of preparedness.

Human Metapneumovirus (HMPV) is a respiratory virus that causes symptoms similar to the common cold and influenza. These include fever, cough, nasal congestion, and difficulty breathing. The incubation period of HMPV ranges from 3 to 6 days, and symptoms typically resolve within 5 to 10 days for most healthy individuals. Young children, particularly those under six months, and older adults with weakened immune systems or chronic respiratory conditions, such as Chronic Obstructive Pulmonary Disease (COPD), are at a higher risk of developing severe complications like pneumonia. The virus spreads through respiratory droplets and contaminated surfaces, particularly in crowded settings (1). Despite its widespread circulation, most HMPV infections are mild, and re-infections are common throughout life, generally presenting with mild symptoms. Severe cases are rare and primarily affect those with compromised immune systems or underlying health conditions (2).

Factors influencing the potential for pandemics

Vulnerability to a pandemic is influenced by a number of factors:

Novelty of the virus: New viruses, such as SARS-CoV-2 at the onset of the COVID-19 pandemic, pose a higher risk as populations lack pre-existing immunity. By contrast, HMPV has been circulating for decades, with most individuals exposed in childhood, resulting in some level of immunity. Emerging infectious diseases, particularly zoonotic viruses, pose significant threats to global health. These pathogens often originate in animals and cross over to humans due to ecological and human-driven factors. Historical examples such as SARS (2003), MERS (Middle East Respiratory Syndrome), and the COVID-19 pandemic illustrate how zoonotic spillovers can escalate into global crises if not managed effectively (3).

Transmission dynamics: Respiratory viruses transmitted through droplets and aerosols, like influenza, RSV, and SARS-CoV-2, can spread rapidly. Crowded indoor settings, poor

ventilation, and lack of protective measures exacerbate transmission.

Virulence and mutation Rates: For instance, influenza viruses are notorious for their frequent antigenic shifts, which necessitate annual vaccine updates.

Zoonotic spillovers and human behaviours: Closer contact between humans and animals, particularly in wildlife markets or industrial farming, increases the risk of zoonotic spillovers. Previous pandemics caused by coronaviruses, such as MERS and SARS have originated in the context of this human-animal interface.

Environmental and ecological changes: Habitat destruction, deforestation, and climate change drive closer interactions between humans and wildlife. For example, the SARS epidemic and subsequent pandemics have been linked to interactions with wildlife species. Altered ecosystems can expand the range of disease vectors (e.g., mosquitoes) and force animals into closer proximity to humans.

Weak surveillance systems: Delayed detection of novel pathogens due to inadequate monitoring or lack of global coordination can allow outbreaks to escalate into pandemics.

Lessons from past pandemics

The COVID-19 pandemic offered invaluable insights into mitigating future threats:

Surveillance: Early detection is key. A strengthened sentinel surveillance system, which routinely collects respiratory specimens, is needed proactive monitoring. Influenza serves as a model for understanding and managing pandemic risks. Influenza viruses have caused numerous pandemics, including the devastating 1918 Spanish Flu. Global influenza surveillance networks, operational for decades and involving extensive international collaboration, demonstrate the value of real-time reporting, annual vaccine updates, and rapid responses to emerging strains. These systems highlight the critical importance of robust infrastructure in mitigating the spread of infectious diseases.

Rapid countermeasures: The development of COVID-19 vaccines within a year demonstrated the power of science and global collaboration. However, delays in equitable distribution highlighted systemic inequities (4).

Public health measures: Non-pharmaceutical interventions such as mask-wearing, physical distancing, and ventilation remain effective for controlling respiratory infections.

Global cooperation: The pandemic underscored the need for international solidarity, particularly for sharing diagnostics, vaccines, and therapeutics.

One Health approach: A critical aspect of pandemic preparedness is adopting a One Health approach, recognizing the interconnectedness of human, animal, and environmental health. The frequent spillover of zoonotic diseases, such as avian influenza and SARS, underscores the importance of monitoring animal populations and regulating wildlife trade. Equally, addressing environmental stressors like deforestation and climate change is vital to reducing zoonotic spillovers (5).

Building resilience for the future requires a comprehensive approach that goes beyond merely responding to outbreaks. Strengthening primary healthcare systems is crucial to ensure they can absorb shocks and maintain essential services during crises. Developing rapid response mechanisms, such as investments in diagnostic platforms, vaccine technologies, and antiviral drugs, can significantly enhance the ability to address emerging threats (6). Public awareness campaigns focused on infection prevention, including the importance of mask use and proper hygiene, play a vital role in curbing disease spread. Addressing non-communicable diseases (NCDs) like diabetes and hypertension is equally critical, as these conditions amplify the impact of infectious diseases. Governments must prioritize NCD prevention through initiatives promoting healthier diets, physical activity, and pollution control. Additionally, equitable access to vaccines, diagnostics, and therapeutics is indispensable for effective pandemic containment, ensuring that no population is left behind.

While HMPV may not have the potential to trigger a pandemic, its resurgence serves as a reminder that preparedness is not a one-time endeavour. It is a continuous process of learning, adapting, and building resilience. By addressing the factors that influence pandemic

potential and strengthening global health systems, we can mitigate the impact of future outbreaks and protect the health of populations worldwide (7,8).

Declaration Of Generative AI And AI Assisted Technologies In The Writing Process

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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