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INNOVATIVE APPROACHES TO MONITOR, MITIGATE, AND PREVENT PANDEMICS

Abstract

As of February 2023, the COVID-19 pandemic has caused over 6.8 million deaths and over 750 million cases worldwide. This pandemic, like the 1918 flu pandemic, has disrupted all sectors of society, increased morbidity and mortality rates, and challenged health system resilience. Access and availability of health care services as well as exposures to harmful exposures like air pollution were disproportionately observed across socioeconomic strata. As our global society is more at risk of infectious disease outbreaks than ever before, experts stress the urgent need for health system preparedness.

The benefits of space-based technologies to population health have been long recognized. In this study, we analyzed the utilization of space-based assets during the COVID-19 pandemic and the potential role that space can play in the monitoring, mitigation, prevention, and preparedness of pandemics. We explored the application of Earth observation data, telemedicine, and space-spinoffs in public health applications of infectious disease outbreaks and zoonotic spillover. We also reviewed the utilization of the One Health concept - which recognizes the interconnectedness of humans, animals, and the shared environment - underscores transdisciplinary collaborations across sectors to address complex global health challenges. With three-fourths of emerging infectious diseases of a zoonotic origin, understanding the dynamics of vector and disease spread in human and animal populations can only be accomplished by leveraging multiple disciplines. Thus Space assets can play a crucial role in supporting transdisciplinary, global and coordinated efforts against pandemics