EDITORIAL

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COVID-19 Pandemic: A New Chapter in the History of Infectious Diseases

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Throughout history, infectious diseases have caused havoc among societies. Emerging and re-emerging infectious diseases are now occurring at unprecedented speed. According to the World Health Organization (WHO), the world has witnessed the emergence of several disease outbreaks and epidemics caused by more than 20 infectious agents over the past decade.[1] Some of these epidemics were caused by novel infectious agents such as H1N1[2] and MERS.[3]

Over the past two decades, the emergence of coronavirus-associated diseases (SARS and MERS) inflicted global challenges to public health systems.[4] SARS-CoV-2 (the causative agent for coronavirus disease COVID-19) is the latest addition to this growing list of unwelcomed novel agents.[5] The WHO declared COVID-19 a public health emergency of international concern on 30 January and a pandemic on 11 March 2020.

The size and reach of today's global travel network are unparalleled. In 2018 alone, more than 4 billion people (approximately 60% of the world population) traveled globally using commercial flights.[6] In today's global convergence, locally emerging pathogens have the capacity to spread rapidly and cross borders and become an imminent public health threat to the entire world. This is exemplified by the current COVID-19 pandemic where the appearance of a seemingly limited cluster of cases of pneumonia linked to a sea food market in Wuhan, China[7] has become one of the worst pandemics in human history with a staggering number of more than 1.4 million infections in 177 countries and more than 85 000 deaths globally as of 9 April 2020.[8] It is worth noting that only a few of the current 177 countries affected seem to have passed the peak of the epidemic while the majority of these countries are just beginning to see a surge in cases.

As the COVID-19 pandemic continues to move at record speed, the speed and volume of the scientific knowledge on SARS-CoV-2 and COVID-19 are correspondingly fast and unprecedented. As of 9 April 2020, the WHO regularly updated bibliographic database of publications on COVID-19 astoundingly including more than 5300 publications[9] of which about 1800 articles appeared in PubMed indexed journals.[10]

Furthermore, the urge for a swift exchange of information relevant to COVID-19 at the time of a global public health crisis – to inform appropriately timed responses – has resulted in a surge in preprints (unrefereed manuscripts that have yet to undergo peer review). As of 10 April 2020, there are more than 1300 preprints in medRxiv and bioRxiv related to the COVID-19 research.[11] As a result of this unprecedented rapid and effective scientific response and prompt information sharing, it took the scientific community a few weeks to characterize the outbreak, identify the causative agent, share its genome, and develop highly specific diagnostics. For the first time in the history of pandemics, a prompt and real-time communication of knowledge and sharing of information between scientists, infectious disease specialists, public health professionals, policymakers, and the general public is possible.

COVID-19 is a respiratory illness with a clinical spectrum of mild to moderate disease (80%), severe disease (15%), and critical illness (5%) with an overall case fatality rate of 0.5–2.8% with much higher rates (3.7–14.8%) in octogenarians.[12] The severe and critical illness categories (about 20% of all infections) have overwhelmed health systems worldwide.

SARS-CoV-2, the agent of COVID-19, primarily spreads by droplets, is easily transmissible (reproduction number R0: 2–3, meaning one

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infected individual could infect three), and can spread through asymptomatic or minimally symptomatic individuals.[12] It has a median incubation period of five-to-six days and a period of infectivity extending from two days before symptom onset to two weeks after disease onset in severe cases.[12]

Proven therapeutics for the treatment of COVID-19 are lacking. Nevertheless, a myriad of investigational regimens are being explored. In its efforts to help find an effective treatment for COVID-19, the WHO has recently launched an international clinical trial called the Solidarity Trial.[13] The trial will compare four treatment options (remdesivir, lopinavir/ritonavir, interferon beta-1a, and chloroquine and hydroxychloroquine) against the standard of care with the aim of rapidly determining whether any of the investigational therapeutics are effective against COVID-19.

The quest for a vaccine against SARS-CoV-2 is an urgent priority, and its development and global availability is a prerequisite for ending the COVID-19 pandemic. Vigorous and internationally coordinated efforts – mainly through the Coalition for Epidemic Preparedness Innovations – for vaccine development are currently in progress.[14] However, an effective vaccine may not be available for the first wave of the pandemic.

Pending availability of an effective vaccine, proactive containment strategies (travel restrictions, case finding, contact tracing, isolation of confirmed cases, and quarantine of exposed individuals) and measured mitigation/suppression interventions (lockdown measures, social distancing, school and educational institutions closures, and postponement or cancellation of large-scale public gatherings) are our only viable options to control this pandemic, and their relaxation must be thoughtfully calculated.[15] Understandably, these drastic public health measures were inconceivable months ago.

The current COVID-19 pandemic and its dreadful global impact is a reminder of the potential detriment of emerging infectious diseases. Fortunately, the world today is better equipped to battle this emerging beast. COVID-19 is, undoubtedly, a once-in-a-lifetime pandemic. Humanity is witnessing moments of extreme uncertainty and an unprecedented global health crisis. Although it is impossible to foresee where this pandemic is heading, certainly, a new chapter in the history of infectious diseases has just begun.

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