

# The COVID-19 Saga: Lessons for the Future

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## EDITORIAL

The severity and impact of the current coronavirus disease (COVID-19) pandemic highlights the need for public health mechanisms to prevent further escalation or future outbreaks. SARS-CoV-2, causative agent of COVID-19, is the third epidemic coronavirus to emerge in the human population in the past two decades. Severe acute respiratory syndrome coronavirus (SARS-CoV-1) occurred in 2002, which reportedly infected 8,098 people and caused 774 deaths worldwide. Ten years later, the Middle East respiratory syndrome coronavirus (MERS-CoV) emerged, causing a total of 2,564 infections, and 881 fatalities as of December 2020 [1]. The current SARS-CoV-2 has resulted in over 95 million cases and 2 million deaths worldwide as of January 17, 2021. Initially, the importation of cases through international travel of infected individuals to uninfected countries was the main cause of the expansion of the pandemic, which has caused unprecedented economic and social impact, ranging from travel restrictions, business closures, and a complete shutdown of social activities. After about one year into the pandemic, it is essential to reflect on the gaps and challenges in response and measures to prevent future outbreaks.

First, there was an apparent delay in recognizing the epidemic as a public health emergency of international concern. It took one month from the time the Chinese government notified the World Health Organization (WHO) about the epidemic on January 3, 2020 to when the WHO declared it a public health emergency of international concern on January 30, and later on March 11, 2020 it was declared a pandemic [2]. Time is obviously of the essence, and if this could be considered in future epidemics of similar magnitude, most countries would institute mechanisms in a timely manner to mitigate the risk of importation or transmission. For example, travel bans or flight restriction from impacted regions.

Second, there was also a delay by some countries in taking swift measures. In the most initially impacted countries of the world such as the United States, Italy, Spain, and France, there was an apparent delay in instituting mandatory lockdowns and maintaining social distancing [3]. For example, the decision to

lockdown Northern Italy was leaked before being approved and the population started to escape from the North to the South. In some parts of Italy, soccer matches with a huge number of spectators were ongoing during the COVID-19 outbreak and this may have impacted the spread of the disease within the country. Other countries, especially those in Africa, were caught up in the misconception that Africans may be genetically resistant to coronaviruses, or that the virus does not survive in warmer, more humid climates. All these factors delayed public health response efforts. In addition, there were also gaps in contact tracing and enforcing self-isolation for those who had been involved in recent international travels.

Third, the risk of healthcare transmission was not seriously considered. Although COVID-19 transmission occurs within the community, healthcare-associated transmission was the main driver of spread in the first wave in highly impacted countries like Italy. There was a prompt need for healthcare workers to be tested, and for those who tested positive to be restricted from work and asked to self-isolate while asymptomatic personnel would wear appropriate PPE (e.g., universal mask and face shield) at work. Furthermore, each healthcare establishment should have an Infection Prevention and Control (IPAC) program with a dedicated and trained team, with at least one trained IPAC focal person. The basic component of such a program must include hand hygiene, appropriate PPE donning/doffing, staff education and retraining, surveillance, outbreak investigation and management, transmission-based precautions, environmental cleaning and disinfection, audits and continuous quality improvement activities related to infection rates and IPAC activities.

In order to prevent further escalation of the current pandemic and prevent future outbreaks, the following considerations are essential: Research for vaccines and therapeutics against coronaviruses must be expanded with focus on protein structures in the virus that are comparatively stable in order to protect from novel and emerging viral strains of pandemic potential [4].

Strengthening of national laboratory systems for early detection of emerging pathogens along with zoonotic disease

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surveillance. Land use activities such as deforestation and farming bring humans and wild animals in close contact and disrupt habitats, thereby providing opportunities for diseases to spill over. Therefore, there is need for a comprehensive investigation of animal reservoirs, mapping of the value chains and networks, and assessing human behaviours that predispose to zoonotic diseases. Also, there is need to improve local capacity and strengthening of the local workforce through a one health approach – that recognizes that the health of people is closely connected to the health of animals and our shared environment.

The COVID-19 pandemic has exposed the weaknesses of the health system in many countries of the world. Therefore, the need for proactive measures to improve health systems and surge capacity (e.g., ventilators, Personal Protective Equipment, etc.) cannot be overemphasized. Scaling up of preparedness plans prior to the onset of a public health emergency should be a priority for every country. For example, the absence or shortage of mechanical ventilators to support COVID-19 patients with breathing difficulties could severely impact the prognosis of the disease.

Despite the proactive preparedness measures, outbreaks may still be inevitable, therefore, measures to effectively respond must be in place. The first consideration in the control of all future epidemics will be timely identifying and mapping out the epicentre of the outbreak and multi-sectoral interventions to prevent or control the spread from the source. For example, travel restrictions to prevent exportation of cases out of the epicentre, or importation to outbreak-free regions.

As soon as an epidemic of pandemic potential is declared, a national state of emergency has to be instituted, and an intersectoral collaboration to enforce social distancing, contact tracing, mass screening, self-isolation and quarantine should be a priority [2].

Considering the long incubation period of coronaviruses (1-14 days) and high rate of asymptomatic infections, wearing of masks by the population is a key source control measure in preventing asymptomatic people from spreading droplets. On the other hand, healthcare providers must wear medical masks during routine patient care and N95 when performing aerosol-generating medical procedures to mitigate the risk of healthcare transmission. Elective procedures should be avoided, and the population should be advised to stay at home and only come to the hospital for critical care needs. This will reduce the depletion of PPE, minimize the overwhelming of the health system, thereby reducing hospital transmission. It has also been shown that SARS-CoV-2 can persist in the air for hours, or on different environmental surfaces for days [5]. Therefore, regular cleaning and disinfection is essential to prevent transmission and the immediate transfer of non-COVID-19

patients into rooms previously occupied by COVID-19 patients should be avoided. The use of UV-C disinfection, air purification technologies and HVAC system enhancement may be relevant in creating a safer environment of care.

Finally, it is important to mention that the most devastated pandemic in history was the Spanish flu of 1918 that lasted for two years, in three waves with 500 million people infected and 50 million deaths. Most of the fatalities occurred in the second wave because the population was tired of self-isolation, quarantine and social distancing measures that when they were first lifted, people jumped out in the streets giving way to the second wave that resulted in tens of millions of deaths. A similar trend is being observed in the current COVID-19 pandemic. Fortunately, one year into the pandemic, vaccine candidates are being used to vaccinate vulnerable and high-risk populations with the ultimate goal of slowing further spread of the virus and reducing fatalities.

Together, the trend of novel coronavirus emergence suggests that coronaviruses will continue to emerge periodically, inducing serious infectious diseases of huge global health impact. The recognition of animals (e.g., bats, camels, snakes, rodents, etc.) as the natural reservoirs for coronaviruses should necessitate intersectoral (one health) targeted surveillance in these animals and in high-risk populations. The world needs a global response system for outbreaks, as an outbreak anywhere is a risk everywhere.

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