Editorial

The Novel Coronavirus (SARS-CoV-2) Pandemic

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Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic began in early December in Wuhan, the 7th most populous city in Mainland China, and was reported to the World Health Organization (WHO) on 31 December 2019.[1] An outbreak of unknown aetiology was suspected because many early cases were linked to a large, live animal market that was misleadingly named Huanan Seafood Market, and the causative agent was identified as a novel coronavirus on 7 January 2020.[1,2] On 11 February 2020, the official names of the virus, SARS-CoV-2, and the disease, coronavirus disease 2019 (COVID-19), were announced by the International Committee on Taxonomy of Viruses and the WHO, respectively.[3]

On 23 January 2020, in view of the exponential increase in the number of cases in Wuhan and the spread of the virus to almost every province in Mainland China during the annual Spring Festival travel season—known as the largest human migration in the world—a quarantine of greater Wuhan was imposed.[4] Over the next 2 weeks, the quarantine order was extended to the rest of Hubei province and other mainland Chinese cities. At the time, these public health interventions were considered unprecedented in scale and geographical coverage.[5,6] Although these measures succeeded in reducing the considerable spread of SARS-CoV-2 to the rest of the world, it soon became clear to many that the virus had already spread far and wide beyond the Chinese Mainland.

Outside Mainland China, the first confirmed case of COVID-19 was a Wuhan resident who was diagnosed on 13 January 2020 in Bangkok, Thailand.[1] Other Asian countries reported cases in short order over the following 2 weeks.[1] As of 2 March 2020, 67 territories outside the Chinese Mainland had reported 8565 confirmed cases of COVID-19 and 132 fatalities, and widespread infection was reported in several Asian countries and in Iran and Italy.[7]

The Virus

A novel coronavirus was identified in the first patients in China. Its genetic sequence is closely related to bat betacoronaviruses (96% homology), while the 2003 SARS-CoV was found to be the most closely related (approximately 79% homology) among coronaviruses that are capable of infecting humans,.[2] Using published viral genomes (which number 119 at the time of writing), scientists at the open-source project, Nextstrain, have estimated that SARS-CoV-2 likely jumped into human hosts as a single introduction (or, less likely, a small number of introductions) between November and early December of 2019.[8] The secondary animal host responsible for the outbreak in Mainland China has yet to be identified.

In terms of human infections, SARS-CoV-2 is substantively different from SARS-CoV and the Middle East respiratory syndrome coronavirus (MERS-CoV). Unlike SARS-CoV and MERS-CoV, SARS-CoV-2 is capable of causing sustained community transmission since an infected host can infect, on average, 2–3 uninfected individuals .[9] The estimated infection fatality rate (IFR)—used in place of case fatality ratio because it is generally believed that a significant number of infected individuals are not diagnosed—of SARS-CoV-2 is also much lower at 0.3–1.0%; in comparison, SARS-CoV had a case fatality rate of 9.6%.[10]

In the first few days of disease onset, the clinical presentation of SARS-CoV-2 is virtually indistinguishable from that of upper respiratory tract infections (URTI) before it progresses to severe and critical disease in just under 20% and 5%, respectively, of all diagnosed cases in a huge cohort of Chinese patients.[6] To date, there is no effective and definitive

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treatment for the virus, although a large number of clinical trials on multiple antiviral drugs and traditional Chinese medications have been launched, mostly in Mainland China.

In brief, SARS-CoV-2 has the transmissibility and lethality of a particularly virulent pandemic influenza virus that is matched only by the 1918 influenza virus which had an estimated case fatality rate of >1%.[11] Unlike influenza, however, SARS-CoV-2 predominantly causes relatively mild disease in infants and young children.[6]

SARS-CoV-2 in Singapore

In Singapore, the first case of COVID-19 was diagnosed on 23 January 2020 in a tourist from Wuhan. Health authorities in Singapore responded promptly by instituting, in rapid succession, a series of public health measures that included aggressive contact tracing, quarantine of contacts, issuance of travel advisories and restrictions, compulsory leave of absence for workers returning from Mainland China and ramping up case detection and infection prevention measures in clinics and hospitals.[12] Almost overnight, all clinics and hospitals had set up temperature and visitor screening facilities and had taken steps to ensure adequate supplies of surgical masks and personal protective equipment (PPE). The primary health sector was hit hardest since most family physician clinics were not equipped to handle an infectious disease outbreak.

Collectively, the measures succeeded in containing the spread of SARS-CoV-2 in the city-state, but they did not eliminate sustained transmission of the virus in the community. Consequently, the level of Disease Outbreak Response System Condition (DORSCON)—a colour-coded national framework that is used to map the disease situation in Singapore—was raised from Yellow to Orange since 7 February 2020, the second highest alert level, to indicate SARS-CoV-2 has not spread widely throughout the country and is contained.[13]

As of 2 March 2020, there were 106 confirmed cases of SARS-CoV-2 including a handful that were not linked to existing cases.[14] Most of them were isolated as inpatients in the newly-built National Centre for Infectious Diseases (NCID); however, to date all public hospitals have had to manage at least 1 confirmed and several suspected COVID-19 cases.

Unfortunately, NCID and the public hospitals were soon faced with the risk of being overwhelmed by the large number of patients that were sent them for screening by primary care physicians who did not want to miss a case of COVID-19, given that it was difficult to distinguish suspected COVID-19 cases from routine URTI and pneumonia, and particularly after local transmission of the virus had taken place and global epidemiology of the virus had changed. It also did not help that employers had begun to send their employees who returned from countries affected by SARS-CoV-2 to them for screening. The situation was only mitigated after the Ministry of Health, Singapore, activated the Public Health Preparedness Clinic (PHPC) scheme—established during the 2009 influenza pandemic—on 14 February 2020 to divert community patients with URTI to any of the 878 clinics that provide subsidised treatment and up to 5 days of medical leave. In particular, the longer duration of medical leave awarded to patients was helpful in reducing patient loads in public hospitals and NCID, since the implicit message to primary care physicians was that it was appropriate for them to miss a mild case of COVID-19.

Future Scenarios

Although the WHO did not declare SARS-CoV-2 as a pandemic on 28 February 2020 and had stressed that containment was still possible,[15] this view was not shared by many from around the world. In any case, it will become increasingly difficult for Singapore—a global hub for travel—to curb cross-border transmissions as SARS-CoV-2 spreads to more countries that, in turn, serve as foci for the spread of the virus. Current efforts at containment in Singapore have cost her economy and health services millions of dollars.[16] It will take months, if not weeks, before the SARS-CoV-2 pandemic is contained globally. Until then, the hope is for an effective vaccine to be developed and launched soon; however, it will take >1.5 years before the first batch of successful vaccines are introduced.

A key aim of containment and mitigation is to prevent existing health services from being overwhelmed by the outbreak of SARS-CoV-2 and its fallout, which was exactly what happened in Wuhan and it led to increased mortality and morbidity not just from COVID-19, but from other diseases as well. The projected IFR for COVID-19 is currently too high for any country to contemplate the possibility of allowing the virus to spread freely through its population just like other respiratory viruses and influenza pandemics in the past.[17] Public health interventions directed at social distancing, improving hygiene practices and countering "misinfodemics" remain a priority and could potentially reduce the spread of influenza and other respiratory viruses. For the general population, these interventions must be balanced against the need to live life normally as far as possible. For workers and students, a possible "new normal" could involve more telecommuting and online learning, respectively.

However, it is important to recognise that not every individual can be expected to do so since there are vulnerable and disadvantaged groups in our workforce and schools who require assistance—in the form of financial aid or subsidies—to use new media and technological tools and applications. As Singapore is a major hub for global professional services and a MICE (Meetings, Incentives, Conferences and Exhibitions) destination, novel ways must be found to convene small to large events to sustain her economic growth.

In clinics and hospitals, it is difficult to contemplate standing down from existing health and safety measures. SARS-CoV-2 can cause severe disease in young and healthy individuals, and critical illnesses and deaths had been reported in health workers in the Chinese Mainland that were attributed to nosocomial transmission.[6,9] Should the current situation deteriorate into a full-blown pandemic, 2 difficult interventions may need to be considered to ease the strain on health workers and facilities.

The first—and easier—intervention is to expand the capacity to conduct rapid diagnostic tests at the primary care level, either in the form of easy to use point-of-care tests by clinics or by a centralised laboratory. This is useful to identify early cases, empower primary care physicians and curb onward transmission.

The second, but more difficult, intervention is to re-evaluate and restructure delivery of health services for non-communicable diseases to minimise contact with health facilities beyond even an expansion of telemedicine and home care services. This will involve a move away from the current model of centralised health financing—where manpower, expertise and equipment are concentrated for efficiency—to a decentralised model. When that happens, it is likely to outlast the SARS-CoV-2 outbreak, but will nonetheless stand us in good stead for the future.

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