

## Outbreak of coronavirus disease 2019

As the epidemic of coronavirus disease 2019 continues, new issues on how to control it come to the fore. Talha Burki reports.



As *The Lancet Infectious Diseases* went to press, the situation with the ongoing epidemic of coronavirus disease 2019 (COVID-19) that started in Wuhan, China, continued to rapidly evolve. As of 9 February 2020, China had confirmed 37 251 cases of COVID-19, an increase of 2657 since the previous day. 6188 of these cases were severe and there had been 812 deaths. Every region of the country has been affected. 24 other nations have reported 307 cases and one death. On Jan 30, 2020, WHO declared the outbreak of COVID-19 a public health emergency of international concern (PHEIC). "Our greatest concern is the potential for the virus to spread to countries with weaker health systems, and which are ill-prepared to deal with it", explained WHO Director-General Tedros Adhanom.

There are suggestions from some quarters that COVID-19 is on the verge of becoming a pandemic, the relatively small number of reported cases outside China notwithstanding. The first cases were linked to a live animal and seafood, or so-called "wet", market in Wuhan, Hubei province, which was quickly closed down. A modelling study published in *The Lancet* on Jan 31 estimated that, on average, every infected individual is infecting 2.68 additional individuals. The researchers posited that as of Jan 25, Wuhan would have seen 75 815 infections with the novel coronavirus.

"If the transmissibility of SARS-CoV-2 was similar everywhere domestically and over time, we infer [...] that epidemics are already growing exponentially in multiple major cities of China with a lag time behind the Wuhan outbreak of about 1–2 weeks", wrote the authors of the

study in *The Lancet*. "Independent self-sustaining outbreaks in major cities globally could become inevitable because of substantial exportation of presymptomatic cases and in the absence of large-scale public health interventions."

All of which is necessarily speculative. The likely course of the epidemic can only be clarified after several key questions that are still open are finally answered. Crucially, the extent to which asymptomatic and sub-clinical patients can pass on the virus still remains unclear. "My sense is that asymptomatic transmission is not the major motor of this outbreak", said Joel Breman, president of the American Society of Tropical Medicine and Hygiene, to *The Lancet Infectious Diseases*. "With respiratory illnesses you usually have to get a massive amount of virus, or bacteria, into the oropharynx and the respiratory tract; it is not so easy for that to happen if infected individuals are not coughing and sniffing."

The specifics of how the virus is transmitted from person to person have also yet to be defined. It is still unknown whether the virus can be spread by the faecal-oral route, for example. The disease pathogenesis is shrouded in mystery. How does the virus replicate in different sites, and how does that relate to the severity of disease? How long patients remain infectious is uncertain, which makes it difficult to decide how long they ought to be isolated. There remains the possibility that the virus is mutating into more or less transmissible forms.

Older patients with co-morbidities seem to be most at risk of developing severe disease as a result of infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the proposed name for the causative virus. Based on the

figures from China, case fatality hovers at around 2%. But it is conceivable that it is much lower, putting it in line with seasonal influenza, if there are large numbers of mild or asymptomatic infections that are not coming to the attention of the Chinese healthcare system. On the other hand, there may be patients who are dying from COVID-19 in the community. "It would be pretty hard for places without diagnostic facilities to differentiate between the coronavirus and seasonal influenza", points out Breman.

The extent of the spread beyond China is difficult to ascertain. There have been no reported cases in Africa, despite the one million or so expatriate Chinese who work on the continent. Nor has the virus been reported in central Asia. "The distribution of confirmed cases is going to be influenced by the extent and quality of the diagnostic screening and testing", said Jimmy Whitworth (London School of Hygiene and Tropical Medicine, London, UK) to *The Lancet Infectious Diseases*. "In some low resource settings there may be unrecognised cases. This is a worry because it makes neighbouring countries and regions vulnerable too." Wuhan is a major transport hub. Moreover, the virus emerged shortly before the Spring Festival, which typically sees around 3 billion trips within China as families gather together to celebrate the Chinese New Year.

The authorities in China have put the Wuhan population under quarantine, and stopped trains and flights out of the city. They have suspended certain long-distance bus routes, including those that depart or arrive in Beijing. In his statement accompanying the declaration of a PHEIC, Tedros repeatedly praised the Chinese response. "We would have seen many



Stock/Robert Wei

### Lancet Infect Dis 2020

Published Online  
February 17, 2020  
[https://doi.org/10.1016/S1473-3099\(20\)30076-1](https://doi.org/10.1016/S1473-3099(20)30076-1)  
See Online/Editorial  
[https://doi.org/10.1016/S1473-3099\(20\)30072-4](https://doi.org/10.1016/S1473-3099(20)30072-4)

For more on **modelling for COVID-19** see **Articles** *Lancet* 2020; published online Jan 31. [https://doi.org/10.1016/S0140-6736\(20\)30260-9](https://doi.org/10.1016/S0140-6736(20)30260-9)

more cases outside China by now—and probably deaths—if it were not for the government's efforts, and the progress they have made to protect their own people and the people of the world", he said. Tedros went on to commend China's "commitment to transparency and to supporting other countries".

Others have been less effusive about how the Chinese government has managed the outbreak. China faced criticism after the death of Li Wenliang from COVID-19 on Feb 1. Li was a doctor at Wuhan Central Hospital. He was detained by the city's police in December 2019 for "rumour-mongering" after he warned that there was a mysterious new virus in circulation. A report in the New York Times on Feb 6, 2020, outlined the harsh conditions that now prevail in the city. "With the sick being herded into makeshift quarantine camps, with minimal medical care, a growing sense of abandonment and fear has taken hold in Wuhan."

WHO reckons that US \$675 million will be required to prepare for and respond to COVID-19 over the next three months. It has scheduled a forum for Feb 10–11 to co-ordinate the research agenda. The Coalition for Epidemic Preparedness Innovations has announced several programmes to develop vaccines against the virus. The organisation's overarching aim is to cut to 16 weeks the time between a new pathogen being gene sequenced and the beginning of the clinical trials for a vaccine.

The animal reservoir of the virus has not been confirmed, but phylogenetic analysis has pointed towards bats, after some unconfirmed speculation of an involvement of snakes and pangolins. Regardless, it does seem likely that SARS-CoV-2 originated in a wet market. "Wet markets are clearly a risk for transmission of zoonotic diseases to humans", commented Tom Solomon (University of Liverpool, Liverpool, UK). "China and other Asian

countries may want to review their policy on these markets to try and minimise the risk. This might mean imposing stricter infection control measures or even banning them altogether."

Breman notes that consumers in the Asian countries where wet markets abound expect to buy live animals and use them in their cooking. In which case, socio-cultural considerations will make advocating for their elimination a tricky proposition, which will need to be carefully tailored to the Asian population. "The wet markets do appear to be a cauldron of exchange of genetic materials from a variety of different animals", added Breman. "So at a minimum we should be monitoring standards of hygiene and keeping track of the microbes that are circulating within the markets."

*Talha Burki*