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## China coronavirus latest: Infections surge past 4,500

Updates on the respiratory illness that has infected thousands of people.



A worker produces protective suits at a factory in Nantong in China's eastern Jiangsu province. Credit: AFP/Getty

Scientists are increasingly concerned about a new virus that has infected thousands of people and can be deadly. The virus is a coronavirus, and belongs to the same family as the virus that causes severe acute respiratory syndrome, or SARS. It causes a respiratory illness, can spread from person to person, and emerged in the Chinese city of Wuhan in December.

Here's the latest news on the outbreak.

## **28 January 05:00 GMT – New cases increase by more than 60%**

The number of confirmed cases in China has jumped to 4515, up from 2744 on 26 January, according to the Chinese Center for Disease Control. Authorities also report that more than 100 people have died as a result of the infection. Cases outside China have reached at least 37, but no deaths have been reported outside the country.

Raina MacIntyre, an epidemiologist at the University of New South Wales in Sydney, says that although the rise in cases likely reflects an increase in authorities testing and detecting the virus, the dramatic jump is concerning. “It’s very much a dynamic picture and until we have an indication that cases are declining, it’s going to continue to be of concern,” she says.

But MacIntyre also notes that researchers are struggling to accurately model the outbreak and predict how it might unfold because the case report data that’s being released by Chinese authorities is incomplete. “What we need to identify is when people got sick, not when the cases were reported and all we’ve seen so far is when the cases were reported.”

## **27 January 13:30 GMT – Scientists estimate how quickly virus spreads**

As the number of confirmed cases of the novel coronavirus climbs into the thousands, scientists around the world are estimating how easily the virus is passed between people – and trying to determine whether those without symptoms can spread it.

One number that epidemiologists want to know is how many people one person with the virus tends to infect – known as  $R_0$ , or R-naught. An  $R_0$  higher than 1 means that countermeasures, such as quarantine, will be needed to contain the pathogen’s spread.

On Thursday evening, after a meeting of an emergency committee responding to the outbreak, the World Health Organization (WHO) published an estimated  $R_0$  of 1.4 to 2.5. Other teams have since come up with slightly higher values<sup>1,2</sup>. These estimates are similar to the  $R_0$  of SARS during the early stages of the 2002–03 outbreak, and of the novel strain of H1N1 influenza that caused a pandemic in 2009. But they are higher than  $R_0$  figures estimated during outbreaks of the Middle East respiratory syndrome (MERS) virus, a

## coronavirus similar to SARS.



### What you need to know about the Wuhan coronavirus

“Now it’s in the range of these other important epidemics, and that indicates the potential that it will cause a similar scale of public-health concern if nothing else happens,” says Mark Woolhouse, an epidemiologist at the University of Edinburgh, UK.

But researchers caution that  $R_0$  estimates come with large uncertainties, because of gaps in the data, and the assumptions used to calculate the figure. They also point out that  $R_0$  is a moving target that changes over the course of an outbreak – as control measures are implemented – and varies from place to place. In the coming days, health authorities and researchers will be looking for signs that the steps the authorities have taken to stem transmission, such as the travel restrictions in Wuhan and other Chinese cities, have reduced the  $R_0$  there.

Another important unanswered question surrounding the virus’s spread is whether – and how extensively – people without symptoms can infect others. A study of a cluster of five infections in a family in Shenzhen identified a child who was infected with the virus but did not show any symptoms<sup>3</sup>. If such asymptomatic cases are common and these individuals can spread the virus, then containing its spread will be much more difficult, researchers say. Few SARS cases were asymptomatic, and this was key to controlling the virus.



### This scientist hopes to test coronavirus drugs on animals in locked-down Wuhan

“Defining the scale of asymptomatic transmission remains key: if this is a rare event then its impact should be minimal in terms of the overall outbreak,” Jonathan Ball, a virologist at the University of Nottingham, UK, said in a statement distributed by the UK Science Media Centre. “But, if this transmission mode is contributing significantly then control becomes increasingly difficult.”

One way to determine whether symptom-free people

can spread the virus would be to study its spread in single households in China, says Sheila Bird, a biostatistician at the University of Cambridge, UK. By closely monitoring all the members of a household in which one person is infected, it should be possible to determine who else contracts the virus and how. Such studies would also be helpful for identifying ways of stopping spread in households, Bird adds.



Travel in and out of the Chinese city of Wuhan has been suspended. Credit: China Daily via Reuters

## 27 January 12:45 GMT – Scientists speak out from locked-down Wuhan

*Nature* has spoken to several scientists who are in Wuhan, which has been on lockdown since last week in a bid to halt the spread of the coronavirus. “The street is near empty,” says Fei Chen, a materials scientist at the Wuhan University of Technology. Researchers say that they are spending most of their time at home, and some have had to cancel travel to conferences.

A scientist who is trying to get into Wuhan – to work with collaborators to test drug compounds that could work against coronaviruses – also described his experiences and motivation to *Nature*. Rolf Hilgenfeld, who is based at the University of Lübeck in Germany, has been trying to develop coronavirus drugs since the 2002–03 SARS outbreak, and wants to test two compounds on animal models in Wuhan.

### **27 January 03:00 GMT – Death toll rises**

At least 80 deaths have now been associated with the virus, all in China, and confirmed cases of the infection, mostly in mainland China, have passed 2,700. Cases have also been confirmed in Taiwan – and in Thailand, Australia, Malaysia, Singapore, France, Japan, South Korea, the United States, Vietnam, Canada and Nepal.

### **24 January 20:00 GMT – What you need to know about the virus**

What you need to know about the Wuhan coronavirus



### **24 January 16:30 GMT – Second US infection**

The US Centers for Disease Control and Prevention (CDC) confirmed on 24 January that a second person in the United States had been infected with the new coronavirus. A woman in her sixties returned to her home in Chicago, Illinois, on 13 January after visiting Wuhan, the Chinese city where the outbreak began. She experienced symptoms a few days later. Doctors immediately suspected an infection with the coronavirus on the basis of her

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travel history. They admitted her to an isolation room and sent blood samples to the CDC's laboratory. She remains in hospital but, in a press release, the CDC says that she is doing well.

The agency warns that there will probably be more US cases of the coronavirus in the coming weeks. But it adds: "The immediate risk of this new virus to the American public is believed to be low at this time."

**23 January 20:00 GMT – World Health Organization decides against emergency declaration**

The WHO has decided not to declare the coronavirus outbreak a global health emergency, it said on 23 January.

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"At this time there is no evidence of human-to-human transmission outside China," said WHO director-general Tedros Adhanom Ghebreyesus. "That doesn't mean it won't happen."

The WHO committee that considered whether to declare a global emergency – the agency's highest level of alarm – met for two days before issuing its verdict.

The panel decided against the declaration in part because the virus's rate of spread between humans remains unknown. "For now, it appears limited to family groups and health workers caring for infected patients," Tedros said.

**Many banded krait *Bungarus multicinctus*.**

A team of researchers pointed to the many-banded krait snake as one possible source of the coronavirus that originated in Asia. Credit: Alamy

**23 January 15:45 GMT – Scientists dismiss claim that snakes spread virus**

Scientists are trying to identify the animals in which the epidemic probably began. In a controversial study published last night, a team of researchers in China claimed snakes were the culprit.

But many scientists are sceptical of this claim and say there is no proof that viruses such as those behind the outbreak can infect species other than mammals and birds. “Nothing supports snakes being involved,” says David Robertson, a virologist at the University of Glasgow, UK.

### **23 January 15:00 GMT – Chinese authorities lock down Huanggang**

A second city in China – Huanggang – is going into lockdown similar to that in Wuhan. Huanggang has a population of about 7 million people and is around 70 kilometres from Wuhan. Public bus and railway operations will be suspended from midnight, Reuters reports. A third city, nearby Ezhou, has shut its train stations.

### **23 January 04:00 GMT – Chinese government closes off Wuhan**

Chinese authorities have suspended all travel in and out of Wuhan – the city at the centre of the outbreak, home to more than 11 million people – in an effort to control the worsening outbreak. Since 10 a.m. Chinese local time, planes and trains leaving the city have been suspended, and buses and the city’s subway have also stopped running.

The announcement is a considerable escalation in China’s response to the outbreak, but whether it will be effective is unclear, says Ian Mackay, a virologist at the University of Queensland, Brisbane. Although quarantining the city might help to curb the international spread of the virus, it won’t stop it from being transmitted between people in the city. Mackay worries that the authorities might have “just created a large cell-culture dish in which all these people will share the infection and create a lot more cases all stuck in Wuhan”.

## Indonesian health quarantine official holds a thermal scanner, Soekarno-Hatta International Airport, Indonesia

Health authorities are monitoring air travellers for a virus that emerged in Wuhan, China. Credit: Mast Irham/EPA-EFE/Shutterstock

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Mackay also questions whether the city will be able to feed its citizens and manage the increasing number of people who have become sick with the virus, as well as with seasonal influenza, without the free flow of supplies and aid from outside the city. He says the lockdown could have a psychological effect on people.

### **22 January 20:00 GMT – World Health Organization delays decision on emergency declaration**

The WHO has postponed a decision on whether to declare the outbreak a “public health emergency of international concern” – a step it reserves for events that pose a risk to multiple countries and that requires a coordinated international response. The move follows a meeting of a committee organized to respond to the outbreak. The same committee will meet again on 23 January.

“This is an evolving and complex situation,” WHO director-general Tedros Adhanom Ghebreyesus said in a press conference after the meeting.

### **22 January 16:45 GMT – Five questions researchers have about China virus**

Scientists around the world are racing to find out more about the coronavirus – including how it spreads and information about its genetic sequences. Researchers have already sequenced several strains of the virus taken from infected people. This information can help to reveal how easily the virus can pass between humans and whether the outbreak has the potential to persist. Researchers in China are also hoping to study whether drugs could be developed to fight the virus.

### **21 January 19:45 GMT – First US case confirmed**

The United States has confirmed its first case of the new coronavirus, the US Centers for Disease Control and Prevention (CDC) said on 21 January. A 30-year-old man in

Washington state has been diagnosed with the illness after a trip to China, making the United States the fifth country to report the disease – and the first outside Asia.

The man had been admitted to a hospital in Washington last week with pneumonia, but “is right now, very healthy”, Nancy Messonnier, director of the CDC’s National Center for Immunization and Respiratory Diseases in Atlanta, Georgia, told reporters. He is under observation at the hospital.

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The CDC says that the man did not have symptoms on his arrival in Seattle, Washington, but developed a fever on 16 January and sought treatment. A hospital in Washington state collected blood from the man and shipped it to the CDC, which identified the virus in the samples on 20 January. The CDC is now tracking down individuals who had contact with the man.

International airports in New York City, Los Angeles and San Francisco, California, have been screening arriving passengers for signs of coronavirus infection since 17 January. All three receive direct flights from Wuhan. The CDC says it will now expand the screening to airports in Atlanta and Chicago, Illinois. All travellers leaving Wuhan for the United States will be routed to one of the five airports that have screening programmes.

#### 21 January – Researchers must share sequences

In an editorial, *Nature* says that researchers have a crucial role in publishing and sharing genome sequences. It also calls on China’s health authorities to continue reporting what they know and what more they are uncovering, and on the WHO to lead and coordinate the global response.

#### 21 January – Chinese health workers infected

Infections have been confirmed in 15 health-care workers in Wuhan; scientists say this suggests that the virus is more adept at human-to-human transmission than was first thought. Previously, Chinese authorities and the WHO had said that there had been some

limited cases of human-to-human transmission between family members, but that animals seemed to be the most likely source of the virus.

In response to the worsening outbreak, the World Health Organization has called a meeting on 22 January to decide whether to declare a public-health emergency.

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