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## 8 questions about the coronavirus outbreak, answered

By Julia Belluz for *Vox.com*, 2-2-20

*Look past the hype; know the facts*

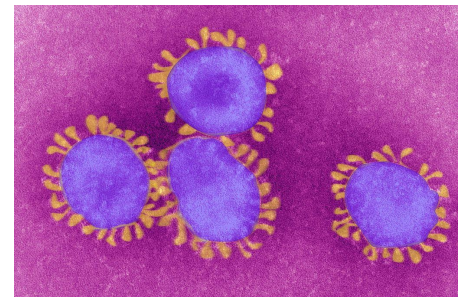
The coronavirus outbreak, centered in China, is evolving at a dizzying speed. And so is the global response. In the past couple of days, Russia and Singapore have sealed their borders to China and the World Health Organization declared the outbreak a global public health emergency. Meanwhile, the US government dramatically escalated its response — issuing its highest-level travel advisory, quarantining 195 citizens evacuated from China, and temporarily banning foreign nationals who have recently been to China from coming in.

With the case toll rising steeply, reaching over 14,000 on February 2, with 300 deaths, and face masks flying off store shelves, it's no wonder questions — and fears — are swirling about 2019-nCoV, as the virus is known.

For most people in the US, though, there's really no reason to worry. And while making sense of risks with a new, quick-spreading pathogen is tricky, infectious disease experts can help us sort it out. Here are answers to your most burning questions about the new coronavirus and its risks.

### 1) What is this new coronavirus, and what are the symptoms?

Coronaviruses are a large family of viruses that typically attack the respiratory system. The name comes from the Latin word *corona*, meaning crown, because of the spiky fringe that encircles these viruses. Most infect animals, such as bats, cats, and birds. Only seven, including 2019-nCoV, SARS, and MERS, are known to infect humans.



SARS is thought to have evolved from bats to civet cats to humans in China; MERS evolved from bats to camels to humans in the Middle East. No one knows where 2019-nCoV came from. For now, it is believed to have made the leap from animals in Wuhan, China, a city of 11 million, late last year. But researchers are still trying to suss out its precise origins.

As for symptoms: Two of the seven coronaviruses that infect humans, SARS and MERS, can cause severe pneumonia and even death in 10 and more than 30 percent of cases, respectively. But the others lead to milder symptoms, like a common cold. At the moment, we know 2019-nCoV can kill — but it's not clear how often or how its fatality rate compares to SARS and MERS.

According to the Centers for Disease Control and Prevention, most patients right now start with a fever, cough, and shortness of breath. An early report, published in *The Lancet*, provided even more detailed information. It looked at a subset of the first 41 patients with confirmed 2019-nCoV in Wuhan. The most common symptoms were fever, cough, muscle pain, and fatigue; less common were headache, diarrhea, and coughing up mucus or blood. All had pneumonia and lung abnormalities on CT scans. As for the disease severity: 13 patients were admitted to an ICU, and six died. By January 22, most (68 percent) of the patients had been discharged from the hospital.

More recently, there have also been reports of people with very mild symptoms, like the four cases in southern Germany. There's also evidence of asymptomatic cases. It's possible that as we learn more, 2019-nCoV will look more like the flu than like SARS. That's because infectious diseases typically look more severe when they're first discovered, since the people showing up in hospitals tend to be the sickest. And already, the new virus appears to be less deadly than both SARS and MERS.

## **2) How do coronaviruses spread?**

We don't yet know how exactly 2019-nCoV spreads, but we do have a lot of data on how MERS, SARS, and other respiratory viruses move from person to person. And that's mainly through exposure to droplets from coughing or sneezing.

So when an infected person coughs or sneezes, they let out a spray, and if these droplets reach the nose, eyes, or mouth of another person, they can pass on the virus, said Jennifer Nuzzo, an infectious disease expert and senior scholar at the Johns Hopkins Center for Health Security. In rarer cases, a person might catch a respiratory disease indirectly, "via touching droplets on surfaces — and then touching mucosal membranes" in the mouth, eyes, and nose, she added. That's why hand-washing is an important public health measure — all the time, and especially in an outbreak.

## **3) Should I travel while this outbreak is going on?**

Both the CDC and the State Department have issued their highest-level travel alerts for China, advising Americans to avoid traveling there for the moment. (These advisories are likely to change as the outbreak evolves, so keep checking them.)

And that's not only because there's a risk of catching this new virus. Right now, numerous airlines are canceling or scaling back flights to China, in part because of decreased demand. "I'm more concerned about the unpredictability of the [outbreak] response at this point," said Nuzzo. "It would not be fun to go to China and get stuck there somehow. And coming back, you'll be subject to additional screening."

But people worried about travel should remember that these advisories focus on China, where the epidemic is currently playing out.

Of the 14,627 confirmed cases right now, 14,450 have been found in mainland China. That's 99 percent. And more than half of those are in Hubei. "The risk of acquiring this infection outside of Hubei and, truly, outside of China is remarkably low," said Isaac Bogoch, a professor at the University of Toronto who studies how air travel influences the dynamics outbreaks — including the new coronavirus infection.

People with the virus have been detected in other countries, which is the reason the WHO declared the outbreak a public health emergency. But to date, those have mainly been travelers from China. "We can count the number of people who never had exposure to Hubei or China who were infected by this virus on one or two hands," Bogoch said. "So if people are traveling [anywhere outside of China,] your risk is close to zero percent."

What if you have to travel and you're seated near someone who is sick? Bogoch said that's not even time to panic. "There has been some work looking into the risk of acquiring infectious diseases through air travel. The risk of acquiring a respiratory infection through air travel is still extraordinarily low."

The risk does go up if you happen to be seated within six feet of a person with a respiratory infection. But even there, simple proximity doesn't necessarily mean you'll catch anything. Instead, the more infectious the person is, and the longer you sit near them, the higher your risk. If you're not near the person for very long, or they're not very infectious, the lower the risk. And again, it's unlikely that sick person even has the coronavirus.

## **4) I'm still worried about the new coronavirus. What should I do to protect myself? Buy a mask?**

In the US, the risk to the public is currently deemed low. And just about every health expert Vox has spoken to has said there's no good evidence to support the use of face masks for preventing disease in the general population.

Masks are only useful if you have a respiratory infection already and want to minimize the risk of spread to others, or if you're working in a hospital and are in direct contact with people who have respiratory illnesses. (Plus, there are reports of runs on masks and other supplies health workers need to stay safe.)

That's why the CDC advises against the use of masks for regular Americans. "The virus is not spreading in

the general community,” Nancy Messonnier, director of the CDC’s National Center for Immunization and Respiratory Diseases, reasoned in a press briefing on January 30. But people are hoarding them anyway, and for the wrong reasons.

The best thing you can do to prevent all sorts of illness, said Messonnier, is “wash your hands, cover your cough, take care of yourself, and keep alert to the information that we’re providing.”

### **5) What about the cases of people spreading the virus before they show symptoms? Isn’t that worrisome?**

The best evidence we have that the virus can spread before a person has symptoms comes from Germany. There, four people are known to have the virus.

The outbreak was identified in Bavaria on January 27, when a German businessman was diagnosed. He had been in meetings with a female colleague who was visiting from Shanghai and had the virus but didn’t know it. The woman only began to feel symptoms — such as fever and a cough — after she left Germany, and days after meeting with the German businessman. This suggests she may have transmitted the virus to the man before knowing she was sick.

By January 28, three co-workers of the businessman were diagnosed with the virus, according to a New England Journal of Medicine case report. One had contact with the woman from Shanghai; the two others appear to have gotten the virus from the German businessman. “The fact that asymptomatic persons are potential sources of 2019-nCoV infection may warrant a reassessment of transmission dynamics of the current outbreak,” the study authors wrote.

But they also emphasized how mild the disease appeared to be among the German patients. And there’s the question of whether the woman was truly without symptoms and how much of a risk asymptomatic spread poses to public health. “Even if there have been cases of asymptomatic transmission of this infection, those will be typically rare cases, and with just about every other respiratory tract infection known to humankind, those are not the people who are driving an epidemic,” said Bogoch.

### **6) Does the WHO declaration that the coronavirus is a global health emergency mean this is going to become a deadly pandemic?**

The WHO’s declaration of a “public health emergency of international concern,” or PHEIC, does not mean we are facing a deadly pandemic.

Instead, a PHEIC is a political tool the agency can use to draw attention to a serious disease threat. It’s meant to engage the global community in a coordinated outbreak response, galvanize resources, give countries guidance on how to react, and stop the disease from spreading further across borders.

The agency’s director general, Tedros Adhanom Ghebreyesus, was very clear that they sounded the alarm as a precautionary measure: The agency is concerned about the potential damage the virus could do in countries with weaker health systems, and called on the international community to help. He emphasized that the vast majority of cases are still in China, and that China has moved swiftly to get the outbreak under control.

If the disease continues to spread, however, it could turn into a pandemic: or a disease that spreads globally, with epidemics in multiple countries around the world. And that’s something health officials in the US and around the world are working to prevent. “We are preparing as if this is the next pandemic,” the CDC’s Messonnier said on January 31.

For now, the CDC and WHO are still calling this an outbreak. Very soon, health experts may determine that there are enough cases in China to call the outbreak an epidemic.

As for the question of deadliness, we don’t yet know how lethal this disease is or how easily it spreads. If you take the current number of deaths and divide it by the number of known cases, “the case fatality is 2 percent — and it’s gone down from 3 percent in the early days,” said University of Michigan’s Howard Markel, who studies outbreaks. “And if it goes really, really low, we’ll probably say — like we did in Mexico in 2009 with swine flu — that it’s something very similar, if not less deadly, than regular seasonal flu.”

So once more of these mild or asymptomatic cases are discovered, this virus could look a lot less scary.

“We live [with] and tolerate a whole lot of respiratory viruses,” said Nuzzo, “some of which are even more transmissible than the estimates people have come out with for this one — but they don’t make the headlines.” If the new coronavirus winds up looking less severe, she added, “we may be moving away from containing the virus as a goal to one of minimizing its spread.”

### 7) Is my city at risk of an outbreak?

Some of the best research on that question comes from Bogoch and his colleagues. They’ve done great studies in the past couple of weeks on the cities most vulnerable to novel coronavirus infections. What’s the big takeaway?

It’s really East Asia and Southeast Asia that are most at risk. The researchers — from the University of Oxford, University of Toronto, and London School of Medicine and Tropical Hygiene — used 2019 data from the International Air Transport Association to find all the cities in China that received at least 100,000 airline passengers from Wuhan during February through April.

They then modeled how the disease could spread from those cities if they experienced local outbreaks. Here are 15 of the top 50 destinations that might see outbreaks (also pay attention to the IDVI — the Infectious Disease Vulnerability Index — number. It’s a measure of a country’s ability to manage an infectious disease. Scores closer to zero mean they’re less prepared.)

Destination city	Urban population*	Destination province / state	Destination country	IDVI	Direct volume**	Total volume**
Taipei	2.6M	Taipei	Taiwan	0.71	1,325,273	1,359,253
Bangkok	8.3M	Bangkok Metropolis	Thailand	0.71	1,187,320	1,232,307
Tokyo	9.3M	Tokyo	Japan	0.93	1,056,382	1,086,105
Seoul	9.8M	Seoul	South Korea	0.88	996,257	1,008,960
Singapore	5.6M	Singapore	Singapore	0.88	720,139	751,064
Osaka	2.7M	Osaka	Japan	0.93	619,960	645,281
Kuala Lumpur	1.8M	WP Kuala Lumpur	Malaysia	0.76	406,056	438,841
Manila	1.8M	Manila	Philippines	0.55	335,932	368,161
Phuket	387K	Phuket	Thailand	0.71	303,961	343,806
London	9M	Westminster	United Kingdom	0.90	199,290	252,127
Sydney	5.2M	New South Wales	Australia	0.91	197,972	242,577
Macau	623K	Macau Special Administrative Region	Macao	***	236,387	236,630
Denpasar Bali	789K	Bali	Indonesia	0.56	181,950	226,641
Kaohsiung	2.8M	Kaohsiung City	Taiwan	0.71	195,770	207,840
Ho Chi Minh City	9M	Ho Chi Minh City	Vietnam	0.63	184,903	204,428

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“By no means would anybody be surprised if there are more cases exported to Europe and the US,” said Bogoch. “But the places that are going to have the greatest volume and number of infections exported would be to East Asian and Southeast Asian centers.”

### 8) When will this end?

There are a few ways this outbreak could end, as my colleague Brian Resnick explained. Perhaps public

health measures — identifying cases fast, putting infected people in isolation — will stop the spread of this coronavirus. (That’s what stopped the spread of SARS in 2003.)

Because this is a zoonotic disease, which came from an animal, finding and eliminating that source would also help. Or maybe a vaccine or antiviral will be invented quickly to curb a broader epidemic (but that’d likely take years).

Finally, there’s the possibility the virus will simply die out. “Disease outbreaks are a bit like fires,” Resnick wrote. “The virus is the flame. Susceptible people are the fuel. Eventually a fire burns itself out if it runs out of kindling. A virus outbreak will end when it stops finding susceptible people to infect.” There’s also the possibility, as Nuzzo told Vox, that this simply becomes one of the diseases in circulation that commonly infects humans. How worrying that is again depends on how severe 2019nCoV turns out to be.

**Response option(s):**

- There is plenty of hype amongst the youth today about coronavirus. Based on this article, which aspects of the hype you’ve heard are overblown, and which are accurate?
- How might social media help limit the spread of viruses like this? How might it make the spread worse?
- Summarize any point made in the article and respond.