

How do you become infected with the coronavirus?

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The new coronavirus has traveled unseen paths from Wuhan, China, to virtually all corners of the globe. Evidence of its movements abound, from the proliferation of people wearing face masks to the sudden absence of toilet paper on store shelves.

How did a virus that didn't even exist just a few months ago manage to infect more than 300,000 people and cause more than 13,000 deaths? How exactly does this pathogen spread?

Here's what scientists have learned so far about the virus known as SARS-CoV-2, which causes the disease known as COVID-19.

How does the new coronavirus infect people?

Through droplets. That is the typical answer physicians give when they talk about how this virus jumps from person to person.

"This virus spreads through respiratory droplets," Dr. Robert Redfield, director of the U.S. Centers for Disease Control and Prevention, said at a recent congressional hearing. It also spreads via "sneezing, coughing and hand contamination," he said.

What are these droplets like?

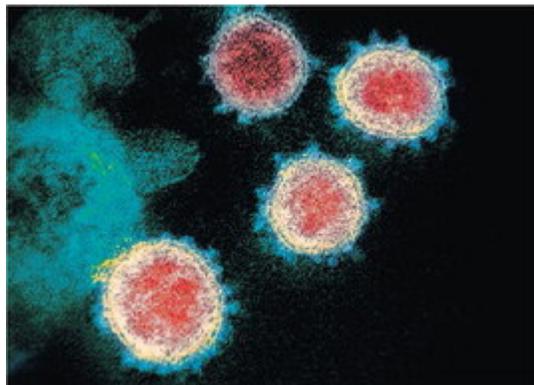
Imagine an infected person who coughs or sneezes. He or she sprays tiny drops of infected saliva, which fall to the ground within seconds, like rain.

Those drops — scientists call them droplets because they are tiny — are loaded with virus that can infect you.

How would the virus get from someone else's saliva into my body?

Getting sneezed at or coughed on by someone who's infected is probably the most common way, according to the CDC. If that virus-carrying saliva lands on a wet part of your face — your eyes, nose or mouth — you'll be infected.

Droplets from a sneeze or cough can fly about 3 feet before they drop to the ground. If the cough or sneeze



This undated electron microscope image made available by the U.S. National Institutes of Health in February shows the virus that causes COVID-19. The sample was isolated from a patient in the U.S. Excitement about treating the new coronavirus with malaria drugs is raising hopes, but the evidence that they may help is thin. [NIAIDRML VIA AP]

Yes, you can. This is why officials urge you to not touch your face.

A sneeze or cough can deposit droplets of infected saliva onto doorknobs, elevator buttons or your cellphone. Alternately, someone who's ill could touch these or other objects, depositing the infected saliva that's already on their hands onto a surface that others will touch.

Then, all you have to do is lay a finger on one of these surfaces and touch your nose, your eye or your mouth.

How long can the virus survive on surfaces?

Scientists ran experiments to find out. In the lab, samples of the new coronavirus remained viable on stainless steel and on plastic for up to three days, according to a study in the New England Journal of Medicine. Tests also found that cardboard could not sustain infectious levels of the virus for 24 hours, and copper couldn't do it for four hours.

The amount of virus the researchers used in their experiments was meant to mimic the amounts typically found in the respiratory tracts of COVID19 patients. However, if the researchers had started out with even more, the virus could have remained viable for a longer period of time.

Also, the time periods reported in the study reflect the specific conditions used in the experiment; if variables such as temperature or humidity were different, the results might be different too.

is “very forceful,” they can go as far as 6 feet, said Dr. Aruna Subramanian, an infectious diseases specialist at Stanford University.

The droplets could also be inhaled directly into the lungs of those nearby. Droplets of saliva remain in the air for only a few seconds before falling to the ground.

“What we’re really talking about is droplet spread,” said Dr. George Rutherford, an epidemiologist and infectious disease expert at UC San Francisco. “Droplets fly out ... and you inhale them on the fly.”

Can I be infected without even noticing?

How long can it survive in the air?

For hours, potentially. However, experts aren’t sure about the chances that virus-infected mist could infect other people, and more research would be needed to determine that answer, said Jamie Lloyd-Smith, an ecology and evolutionary biology professor at UCLA who worked on the new study.

How do we know the coronavirus can become airborne?

Scientists made it airborne in the study Lloyd-Smith cowrote. Indeed, they showed just how the virus can survive as an aerosolized particle.

Is an aerosolized particle different from a droplet?

An aerosolized particle is much smaller than a droplet. It can float and fly in a room for hours, much like an aerosolized air freshener. A droplet, meanwhile, is large enough that it drops to the ground by gravity within seconds.

OK, where were we?

We were discussing the lab experiment. Scientists put coronaviruses through a machine called a nebulizer, transforming them into a mist in an enclosed space. The researchers found that the coronavirus survived in aerosolized particles for at least three hours. Added bonus: They were still able to infect cells and replicate.