

Coronavirus can float in air and WHO and CDC should tell people that, experts say

(CNN) Imagine a noisy, crowded bar. Music is pounding, and people are clustered close together, talking loudly, or even shouting to be heard. If it's cold out, doors and windows are shut tight and the heat is on, or if it's hot out, everything is shut and the air conditioner is recirculating the air.

This, in Donald Milton's opinion, is the perfect situation for spreading coronavirus.

Not only could people pass the virus directly from one to another in the little droplets that we all spray to one degree or another when we talk, laugh or sing; but those little droplets also go up into the air where, Milton says, they can float around for at least some time.

Milton, a professor of environmental health at the University of Maryland who studies how viruses are transmitted, has helped lead a group of 239 scientists who wrote an open letter to appeal for better recognition of the potential airborne transmission of coronavirus.

"The airborne transmission word seems to be loaded," Milton, one of two main authors of the letter, told CNN.

"The current guidance from numerous international and national bodies focuses on handwashing, maintaining social distancing, and droplet precautions," Milton and colleagues wrote in the letter, published in the journal *Clinical Infectious Diseases*.

"Most public health organizations, including the World Health Organization, do not recognize airborne transmission except for aerosol-generating procedures performed in healthcare settings. Hand washing and social distancing are appropriate, but in our view, insufficient to provide protection from virus-carrying respiratory microdroplets released into the air by infected people," they added.

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people afraid'

"I guess we are hoping that WHO will come around and be more willing to acknowledge the important roles of aerosols, whether they want to call it airborne transmission or not," Milton said.

Milton studies the airborne transmission of viruses. The other main author, Lidia Morawska, is a professor of environmental engineering and an expert in aerosol science at the Queensland University of Technology in Brisbane, Australia. Milton said they and a group of other, similar experts have been discussing the potential airborne transmission of coronavirus since February.

Milton said the group wants to demystify the word so that health agencies will be less fearful about using it.

"They don't want to talk about airborne transmission because that is going to make people afraid," he said. There's also an element of worry that if people think the virus is airborne, they'll stop doing other things they need to do to prevent transmission, such as washing hands, staying apart, and cleaning surfaces.

"The best vaccine against fear is knowledge and empowering people to take care of themselves," Milton said. "I want them to understand to what extent washing their hands is important. Why wearing a mask is important is because it blocks the aerosols at their source when it is easy to block them." It's harder to block aerosols once they are floating in the air, he said.

The virus is carried on droplets that come out of people's mouths and noses, and the sizes of those droplets vary. Large droplets fall onto surfaces rapidly and can be picked up on fingers and carried to the eyes, nose, or mouth. Smaller droplets can stay in the air longer and can be inhaled more deeply into the lungs.

"There is significant potential for inhalation exposure to viruses in microscopic respiratory droplets (microdroplets) at short to medium distances (up to several meters, or room-scale), and we are advocating for the use of preventive measures to mitigate this route of airborne transmission," Milton and his colleagues wrote.

"Studies by the signatories and other scientists have demonstrated beyond any reasonable doubt that viruses are released during exhalation, talking, and coughing in microdroplets small enough to remain aloft in air and pose a risk of exposure at distances beyond 1 to 2 meters (yards) from an infected individual," they added.

"For example, at typical indoor air velocities, a 5-nanometre droplet will travel tens of meters, much greater than the scale of a typical room, while settling from a height of 1.5 metres (about five feet) to the floor."

What's not clearly understood is how important droplet size is to coronavirus transmission, Milton said.

But studies show it's a factor, Milton added. "A lot of people crowded close together indoors where it is poorly ventilated — that is what drives the

pandemic,” he said. A loud bar, where people must raise their voices to be heard, is a perfect storm of close contact, poor air circulation, and people generating a lot of virus-carrying particles by talking, laughing, and shouting.

He said WHO is worried about giving advice that people, especially health care workers in low-resource settings, cannot follow. The best way to protect workers from fine aerosols is the use of an N95 respirator or higher — something in scarce supply in many places.

Advice to avoid coronavirus transmission

But Milton said there are other ways, too, including improved ventilation, as well as distancing and mask use. And that’s information the average person, as well as health care professionals, can use and act on.

“I am very much concerned about the general public and schools and ventilation in school buildings and in dorms on college campuses and in bars and in churches and where people sing and where people congregate,” he said.

The group gives practical advice in its letter.

- Provide sufficient and effective ventilation (supply clean outdoor air, minimize recirculating air) particularly in public buildings, workplace environments, schools, hospitals, and age care homes.
- Supplement general ventilation with airborne infection controls such as local exhaust, high-efficiency air filtration, and germicidal ultraviolet lights. (These would be placed high up in the ceiling to avoid damage to people’s eyes and skin)
- Avoid overcrowding, particularly in public transport and public buildings.

“Such measures are practical and often can be easily implemented; many are not costly,” they wrote.

“For example, simple steps such as opening both doors and windows can dramatically increase airflow rates in many buildings.”

In a car, Milton advises open windows and make sure the air conditioning or heat is not recirculated but set to include outside air.

In buildings, carbon dioxide monitors can help managers know if the air is being refreshed properly, Milton said. Outdoors in an urban area, he said, carbon dioxide levels are about 350 parts per million in the air. Exhaled breath carries about 38,000 parts per million of carbon dioxide. Indoors, he said, if the air has 1,000 parts per million carbon dioxide content or less, “that’s pretty good,” Milton said.

Arman Azad and Wesley Bruer contributed to this story

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