

We cannot keep ignoring the possibility of airborne transmission. Here's how to address it.

Opinion by **Joseph Allen**

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If you've been following advice about covid-19 from the Centers for Disease Control and Prevention or the World Health Organization, chances are you've heard a lot about how the coronavirus can travel through large droplets via coughing and sneezes. You've also probably heard about the virus being transmitted through surfaces. But you probably haven't heard anything about airborne transmission, which many organizations have largely ignored.

That's a mistake. Airborne transmission — caused by small particles that can linger in the air for extended periods of time, unlike droplets from coughs, which settle quickly — is key to understanding why this disease spreads so rapidly in certain circumstances. It's also key to figuring out how best to reopen our country.

I've been warning about airborne transmission of covid-19 since [early February](#). The explosive transmission on the Diamond Princess cruise ship, as well as other coronavirus outbreaks, constituted telltale signs that airborne transmission was happening. Close contact transmission was likely happening on that cruise ship, but the disease had spread far more quickly than non-airborne

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Linsey Marr and I outline in a recent paper. Scientists have detected the virus in places that can be reached only by air, such as ductwork; asymptomatic transmission is occurring, meaning people are spreading this without coughing or sneezing large droplets; and basic aerosol physics shows that people shed an entire continuum of particles when they cough, sneeze or talk, including large particles that settle out quickly and smaller ones that stay afloat for hours.

Why is airborne transmission so important? One reason: super-spreader events. Covid-19 does not spread from one person to the next equally. Some infected with the virus may not spread it to anyone, while others may spread it to dozens or more. In fact, one recent paper found that 10 percent of cases led to about 80 percent of the spread.

Such super-spreader events appear to be happening exclusively indoors, where airborne transmission is more likely. Consider the infamous March 10 choir practice in Skagit County, Wash., where one member of the choir infected 52 of 60 other members, leading to two deaths. Local public health departments did an investigation and concluded that all three modes of transmission were likely involved in the outbreak. But this likely under-emphasizes the role that airborne transmission played. Neither surface nor droplet transmission is likely to have infected so many people in one event. But we do know that when people sing, they emit as many aerosol particles as they do when they're coughing. The practice also happened from 6:30 to 9 p.m., when most buildings turn off their ventilation systems. (Local investigators don't mention building ventilation in their report, so we are left to infer.)

The evidence suggests that mitigating airborne transmission should be at the front of our disease-control strategies for covid-19. In some ways, that only bolsters public health measures already in place, such as avoiding groups and wearing masks in public. But it also requires that we minimize exposure to airborne pathogens, especially indoors.

To do that, we need to do two things. First, maintain physical distancing. Six feet is good, but 10 feet is better. Second, we must deploy healthy building strategies, such as refreshing stale indoor air. We do this by opening windows in our homes and cars and by increasing the outdoor air ventilation rate in buildings with HVAC systems. Any recirculated air needs to pass through a high-efficiency filter so an infected person in one room doesn't contaminate people in an adjacent room (as happened with the first SARS outbreak). We also have to make sure places such as bathrooms and rooms with infected patients have enough exhaust, and are negatively pressurized relative to common areas, so any airborne virus is confined to limited areas. This isn't rocket science; as far back as 1860, Florence Nightingale said, "Cleanliness and fresh air from open windows, with unremitting attention to the patient are the only defence a true nurse either asks or needs."

We also need to recognize that some groups are more vulnerable to the ravages of this virus. Just looking at these next few statistics will tell you everything you need to know about where we need to target our intervention efforts. One in 2 deaths nationally are workers or residents of senior homes:

target our intervention efforts. One in 5 deaths nationally are workers or residents of senior homes, nine of the top 10 clusters in the United States occur in meatpacking plants and prisons; the death rate in hot spots is 10-fold higher in areas with lower incomes; and communities of color have nearly five times the odds of infection. If we are to get a handle on this pandemic, it is imperative that we continue to identify those at most risk and provide them precision support.

It's past time we put the pieces together and acknowledge the scientific record on airborne transmission of covid-19. Only once we do this can we take control of the super-spreading events that are driving the epidemic.

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