

COVID-19: FIVE YEARS LATER

AMERICA IS SLEEPING ON A POWERFUL DEFENSE AGAINST AIRBORNE DISEASE

Treating clean indoor air as a public good would have protected Americans against more than COVID-19.

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In the early evening of March 7, 2020, I was on my cellphone in an airport terminal, telling a friend that I was afraid to write an article that risked ruining my journalistic reputation. I had been speaking with the small but close-knit aerobiologist community about the possibility that the new coronavirus could travel easily from person to person through the air—not just through large droplets that reach only a short distance from an infected person or through handshakes. The scientists had stressed that the

idea of airborne transmission of the new virus was still mostly theoretical, but they'd seemed pretty concerned.

When my story came out the following week, it was, to my knowledge, the first article by a journalist to make the case that the virus causing COVID-19 might travel efficiently through the air, and could potentially cover many meters in a gaseous cloud emitted with a cough or a sneeze. To avoid stoking undue worry, I had argued against calling the virus “airborne” in the headline, which ran as “They Say Coronavirus Isn’t Airborne—But It’s Definitely Borne by Air.” That idea was not immediately accepted: Two weeks later, the World Health Organization tweeted, “FACT: #COVID19 is NOT airborne.” As the pandemic unfolded, though, it became clear that the coronavirus did indeed spread through airborne transmission—even if the WHO took more than a

year and a half to officially describe the coronavirus as a long-range airborne pathogen.

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By then, amid the loud debate over mask mandates, vaccine boosters, and individuals' responsibility for the health of others, a parallel debate had emerged over ventilation. Wearing an N95 or receiving a third COVID shot were ultimately individual choices, but breathing safer air in indoor spaces required buy-in from bigger players such as education departments and transit agencies. Some advocates held up clean air as a kind of public good—one worth investing in for shared safety. If it had succeeded, this way of thinking would have represented one of the most lasting paths for governments to decrease people's risks from COVID and from airborne diseases more generally.

In the United States, the federal government regulates the quality of air outdoors, but it has relatively little oversight of indoor air. State and local jurisdictions pick up some of the slack, but this creates a patchwork of rules about indoor air. Local investment in better air-quality infrastructure varies widely too. For example, a 2022 survey of COVID-ventilation measures in U.S. public-school districts found that only about a quarter of them used or planned to use HEPA filters, which have a dense mesh for trapping particles, for indoor air. An even smaller fraction—about 8 percent—had installed air-cleansing systems that incorporated ultraviolet light, which can kill germs.

For decades, experts have pushed the idea that the government should pay more attention to the quality of indoor air. In his new book, *Air-Borne: The Hidden History of the Life We Breathe*, the journalist Carl Zimmer shows the long arc of this argument.

He notes that Richard Riley, a giant in the field of aerobiology who helped show that tuberculosis can be airborne, believed that individuals shouldn't have to ensure that the air they breathe is clean. Just as the government regulates the safety of the water that flows into indoor pipes, it should oversee the safety of air in indoor public spaces.

More than half a century before the coronavirus pandemic, Riley positioned this idea as an alternative to requirements for widespread masking, which, he said, call for "a kind of benevolent despotism," Zimmer reports. If cleaner air was the one of the best ways to reduce the societal burden of disease, then the two best ways to achieve it were to push people to wear masks in any public space or to install better ventilation. The latter approach—purifying the air—would mean that "the individual would be relieved of direct responsibility," Riley reasoned in a 1961 book he co-

authored: “This is preventive medicine at its best, but it can only be bought at the price of civic responsibility and vigilance.”

Medical breakthroughs in the years that followed may have deflated enthusiasm for this idea. Zimmer writes that the huge advances in vaccines during the 1960s made the world less interested in the details of airborne-disease transmission. Thanks to new vaccines, doctors had a way to prevent measles, the WHO launched a campaign to eradicate smallpox, and polio seemed on its way out. On top of that, researchers had come up with an arsenal of lifesaving antibiotics and antivirals. How viruses reached us mattered less when our defenses against them were so strong.

In the first year or so of the coronavirus pandemic, though, one of the only defenses against COVID was avoiding it. And as a debate raged over how well the

virus spread in air, the science of aerobiology was thrust into the spotlight. Some members of the public started fighting for good ventilation. A grassroots effort emerged to put homemade air purifiers and portable HEPA filters in public places. Teachers opened classroom windows when they learned that their schools lacked proper ventilation, travelers started carrying carbon-monoxide monitors to gauge the air quality aboard planes, and restaurants began offering outdoor dining after diagrams were published showing how easily one person eating inside can expose those seated nearby to the virus.

The federal government did take some small steps toward encouraging better ventilation. In mid-2023, the CDC put out new recommendations urging five air changes an hour (essentially replacing all of the air within a room) in all buildings. But it was a recommendation, not a requirement, and local

governments and owners of public buildings have been slow to take on the burden of installing or overhauling their ventilation systems. Part of this was surely because of the daunting price tag: In 2020, the Government Accountability Office estimated that approximately 36,000 school buildings had substandard systems for heating, ventilation, and cooling; the estimated cost for upgrading the systems and ensuring safe air quality in all of the country's schools, some experts calculated, would be about \$72 billion. Portable HEPA filters, meanwhile, can be noisy and require space, making them less-than-ideal long-term solutions.

For the most part, momentum for better indoor air quality has dissipated, just as interest in it faded in the 1960s. Five years after COVID-19 precipitated lockdowns in the U.S., the rate of hospitalizations and mortality from the disease are a fraction of

what they once were, and public discussion about ventilation has waned. Truly improving indoor air quality on a societal scale would be a long-term investment (and one that the Trump administration seems very unlikely to take on, given that it is slashing other environmental-safety protections). But better ventilation would also limit the cost of diseases other than COVID. Tuberculosis is airborne, and measles is frighteningly good at spreading this way. There is also evidence for airborne dissemination of a range of common pathogens such as influenza, which in the U.S. led to an estimated 28,000 deaths in the 2023–24 flu season. The same holds true for RSV, or respiratory syncytial virus, which each year causes 58,000 to 80,000 hospitalizations of children under age 5 in the United States, and kills as many as 300 of them. Virologists are also now asking whether bird flu could evolve to efficiently transmit through air, too.

For those of us still concerned about airborne diseases, it feels as though little has changed. We're right where we were at the start of the pandemic. I remember that moment in the airport and how I'd later worried about stoking panic in part because, during my flight, I was the only person wearing an N95—one that I had purchased months ago to wear in the dusty crawl space beneath my home. On the plane, I felt like a weirdo. These days, I am, once again, almost always the lone masker when I take public transportation. Sometimes I feel ridiculous. But just the other week, while I was seated on the metro, a woman coughed on my head. At that moment, I was glad to have a mask on. But I would have been even more relieved if the enclosed space of the metro car had been designed to cleanse the air of whatever she might have released and keep it from reaching me.

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