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The Next Covid Dilemma: How to Make Buildings Breathe Better

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Wired

Better indoor ventilation systems could make people safer and healthier—and not just because they'd slow down the coronavirus.

Clambering around the ceiling of a big-box store, Jeff Siegel, a mechanical engineer at the University of Toronto, had no idea that he was looking at the post-pandemic future of air-conditioning systems. Siegel studies indoor air quality, and he and his colleagues were testing the air in the store—he wouldn't say which one. This is the possibly grim future part: While they were up there, they found that one of the six HVAC units (that's heating, ventilation, and air-conditioning) was installed exactly upside down. Like, 180 degrees from spec. "The door that was used to access the filter couldn't be fully opened, and the filter couldn't be replaced," Siegel says.

When the team went back six months later to test again, "the filter was entirely plugged with dust and other stuff. There was literally no way to change it without a Sawzall to cut the frame," Siegel says. At the time, Siegel knew what that meant. The air inside the store would be that much crummier. It was, in a way, just like a thousand other HVAC mistakes Siegel has seen: dampers that are supposed to admit outside air into a building rusted open or shut, badly installed filters letting air pass around their edges, forced-air fans running barely 18 percent of the time. In theory, HVAC heats and air-conditions. In practice, it doesn't always ventilate or filter.

But now that scientists around the world largely agree that the pandemic virus SARS-CoV-2—like a lot of other respiratory viruses—transmits most easily indoors, in crowded and poorly ventilated spaces, that occasional, multipronged failure signifies a much more serious problem. As the number of people infected with Covid-19 in the US breaks records, and cooped-up kids and suffering business owners agitate for a life slightly more normal, the once boring ventilation and filter systems in the guts of homes, schools, offices, and factories have become a focus of debate. People know that if they want to go back

inside those buildings—even while masked and 6 feet away from each other—something has to vent potentially virus-infused air. That means a renewed interest in HVAC, and possibly a new future for an often-overlooked field of science. Maybe. “The best HVAC in the world performs poorly when it’s not well maintained, and the usual standard is ‘not well maintained,’” Siegel says. “What we’re seeing now in the pandemic is that people want HVAC to help us, and it’s like, wait a second—you’ve systematically underinvested and not done the kinds of things you should do to have a well-functioning system.”

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