

How I Mastered the Art of Ventilating My Home

Let me tell you about my fans.

Craig Mod

The Atlantic Monthly – September 8, 2020

My obsession with ventilation began long before the pandemic. Five years ago, when I moved from central Tokyo to the coast of Japan, a blanket of humidity seemed to levitate out from the sea and the surrounding mountains, wrapping everything I owned in a moist haze. Combined with crushing summer heat, it cultivated a perfect recipe for mold.

That first summer, my ventilation game was weak. The *tatami* mats—traditional Japanese straw flooring—sprouted dark clumps. A yeasty smell took root in the entryway, and sure enough, on close inspection, a few pairs of my shoes were baking their own bread. Books placed near windows seemed to become sentient with ever-evolving tendrils of hyphae along their spines.

I asked around. *Was this normal?* “Oh yes. Welcome to mold country,” was the common refrain. Old-timers told harrowing stories of hanging clothes out to dry in the sun and forgetting to take them in at night. By the next morning, they’d gone feral. The wet, stagnant night air was mold heaven. I was traumatized. For 10 months of the year, the area was idyllic, livable, and most importantly, dry. But how would I survive the sticky summers? I had never once before given thought to ventilation.

My personal concern is now a global one. Ventilation plays a major role in transmission of the coronavirus: The odds of catching the coronavirus are nearly 20 times higher indoors than if you’re outside. Droplets containing the virus are insidious. They can linger in a badly ventilated room, potentially spreading throughout even if you’re keeping a safe distance from others. People who are asymptomatic don’t sneeze or cough, but they still release a steady stream of aerosols as they jabber away over salads at lunch or lecture to their students at a university. “Those particles can be suspended in air for hours, and maintain infectivity,” says Jiarong Hong, a mechanical engineer at the University of Minnesota. “But,” he emphasizes, “if you do even just a *little* bit of a better job [of improving ventilation], you can significantly decrease risks.”

Since my initial bout with mold, I’ve spent an absurd amount of time and energy on a quest to perfect the airflow in my home. What started as an act of desperation has evolved into something bigger: a way of life. Ventilation doesn’t just keep us safer during the pandemic, I’ve realized; it lifts the spirit and the mind. Allow me, this amateur ventilation expert, to teach you how to better ventilate.

My initial impulse toward a mold-free life was to seal the windows and endlessly run the air conditioner. That helped, but created unintended pockets of moisture. My HVAC isn’t centralized, and because there’s no AC in the hallway, I came home from a weekend trip to find

that my bedroom door had grown its own skin. The AC had generated enough of a temperature gap to produce condensation on the outside of the door: instant mold. So too with the pandemic: AC alone often doesn't cut it, Hong told me. If an AC unit just blows air in circles, aerosols can stick around. Gross.

Dehumidifiers were my next idea. I bought two hulking machines, the kind you can leave on for 24 hours a day. Household dehumidifiers typically fill up with water in just a few hours as they try to keep humidity below 70 percent. But these industrial-strength ones drain continuously via a hose, so you never have to empty their tanks. Paired with the AC, the dehumidifiers transformed the atmosphere from yeasty oven to dry comfort, but the air still lacked verve and freshness.

On a whim, I purchased a Vornado fan, stuck it in the corner of my living room, and turned it on. Instantly, I felt like a fool. Were fans the simple solution to this moldy puzzle? But the Vornado was no ordinary fan. It was so powerful that it seemed to inhale the room, invert it, and push it back out. The totality of how it moved *all* the air was a revelation. Buoyed by this fairly obvious insight, I took things further. I purchased some in-window ventilation units that you can install on your own. I fitted them tightly into windows on opposite sides of the room. One pulls in air, and the other pushes it out. Good lord. Standing in the middle of the living room with the vents and Vornado all working in concert was pure rapture. The AC and dehumidifier almost felt unnecessary.

I now own three Vornados and a small army of those in-window units, strategically placed so that no particle of air stagnates in my 1,000-square-foot home. The resulting vortex of moving air eliminates any chance of particle buildup, of a heaviness of atmosphere taking root. Light a cigarette anywhere in my house, and you'll be dazzled by the flow of the smoke—up and around, through doorways, swirling toward the ceiling and then back to the floor, inscribing elegant arcs through the air—never resting until it finds its way out a window.

I asked Hong whether I was crazy. Was all of this overkill? Sure, the air felt comfortable, but was it really any better? “You solved it intuitively,” Hong said. “From a fluid-mechanics point of view, you are producing a pressure gradient,” which is a fancy way of saying that the air in my house is successfully moving from one side to another. Without a pressure gradient, you end up with what Hong calls a “stable circulation,” in which particles move around and around with no exit route. A big no-no.

One of my rooms has only one window, and therefore only one vent. Hong admonished me. “It’s a very, *very* bad design to have ventilation in and out in the same place. Much better to have multiple locations.” For those of us renting homes, knocking a new hole in a wall to add a second vent can be difficult. But for businesses, adding vents could be a smart investment.

Thankfully, you can create safer air without going to my extremes. If you can’t afford in-window vents, just crack as many windows as possible. Open doors between single-window rooms to help establish gradients. Do this even with the air conditioner on, or the heater come winter. Yes, it’s less energy efficient, but even one cracked window will slowly replenish stagnant air. Two cracked windows help the air better figure out how to move. You can also augment the quality of

air in a single-vent room by adding a HEPA filter, which has been shown to effectively reduce dangerous aerosols.

As for fan *placement*, be intentional. If they're pointed toward walls, the fans will create pockets where air just loops in circles—that dreaded “stable circulation.” Instead, have fans blow *through* the room in such a way as to shuffle air toward out-vents or open windows. Since modifying the direction in which an AC blows can be difficult, it is sometimes useful to place fans perpendicular to an AC's stream. This further helps eliminate any stagnant air pockets the AC may produce because of suboptimal placement. The final results should be clear but subtle: The goal isn't a wind tunnel, but a gentle sense of active air.

You'll likely know if you've been successful, because—thanks to the vents, the open windows, and the free-flowing air—the room should feel lighter, smell better, and seem far fresher than it did before. Odors should dissipate quickly. And microparticles of spittle should be whisked away at a pace that makes contracting a virus significantly less likely. Your mold will be gone, your head clear, and your life ever safer.

Become as obsessed with ventilation as I am, and you'll develop what can be described only as “ventilation radar.” You sense the torpor of a hotel room in which the windows don't open. You feel suffocated in a café without a breeze. You can walk into a restaurant and instinctively estimate risk, eyeballing potential dead-air hot spots and considering whether aerosols might be a problem. How many windows are open? Is the restaurant using both AC and fans? You start to bail on weakly ventilated joints. Ventilation becomes a proxy for everything. If the ventilation is bad, what about the food? If management can't get something as obvious as the airflow in check, who *knows* what horrors might be going on in that kitchen.

In fact, my journey has convinced me that ventilation is perhaps *the* fundamental aspect of home design. Ventilation—how air flows, where it flows, how much of it flows, and how quickly it's replenished—establishes the beating heart of a building. Even the most thoughtfully designed room is insufferable if it's unbearably stale.

Five years on, the summers no longer scare me. I'm even feeling a pang of nostalgia as this one comes to an end. My floors are clump-free, my doors without skin, and my boots without bread. The air around me swirls and is full of life, and it doesn't hang around long enough for microbial buddies to take root on surfaces. These days, the only active starter in my home is for sourdough.