

The coronavirus pandemic might make buildings sick, too

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While millions of people are under orders to stay home amid the coronavirus pandemic, water is sitting in the pipes of empty office buildings and gyms, getting old and potentially dangerous.

When water isn't flowing, organisms and chemicals can build up in the plumbing. It can happen in underused gyms, office buildings, schools, shopping malls and other facilities. These organisms and chemicals can reach unsafe levels when water sits in water pipes for just a few days. But, what happens when water sits for weeks or months?

There are [no long-term studies](#) of the risks and only [minimal guidance](#) to help building owners prepare their water for use again after a long shutdown.

As researchers involved in building water safety, we study these risks and advise building owners and public officials on actions they can take to reduce the potential for widespread waterborne disease. A [new paper](#) highlights these issues and our concerns that the COVID-19 stay-at-home orders may increase the chance of harmful water exposure when people return.

What happens when water gets old?

Just like food that sits in a refrigerator for too long, water that sits in a building's pipes for too long can make people sick.

[Harmful organisms](#), like the bacteria that cause Legionnaire's disease, can grow. If not maintained, devices like [filters](#), [water tanks](#), [heaters](#) and [softeners](#) can become organism incubators.

With certain pipe materials, water can accumulate unsafe levels of [lead](#) and [copper](#), which can cause [learning disabilities](#), [cardiovascular effects](#), [nausea and diarrhea](#).

Drinking this water is a problem, but infections can also result from inhaling harmful organisms. This occurs when water splashes and becomes an aerosol, as can happen in [showers](#), [hot tubs](#) and [pools](#) and when [flushing toilets](#) or [washing hands](#). Some of these organisms can cause pneumonia-like [diseases](#), especially in people who have weakened immune systems.

Water inside a building does not have an expiration date: Problems can develop within days at individual faucets, and all buildings with low water use are at risk.

Keep the water flowing

To avoid water issues, "fresh" water must regularly flow to a building's faucets. Most U.S. water providers add a [chemical disinfectant](#) to the water they deliver to kill organisms, but [this chemical disappears](#) over time.

Medical facilities, with their vulnerable populations, are [required](#) to have a [building water safety plan](#) to keep water fresh and prevent growth. Schools, which have long periods of low use during the summer, are [advised](#) to keep water fresh to reduce water's lead levels.

Health agencies in the [U.S.](#), [Canada](#), [England](#), [Europe](#) and [some states](#) have released recommendations in recent weeks, advising that building water be kept fresh during COVID-19 stay-at-home orders. There's some debate over the best way to do that, but the core message is the same: [Do not let water sit in buildings](#).

Flushing accomplishes several goals. Caitlin Proctor/Purdue University.

If water isn't being used in a building, intentionally flushing the building to [replace all the old water](#) with new water can be done [at least weekly](#). It also helps [remove sediments](#) that accumulate along pipe walls.

Faucets, water heaters and softeners, appliances such as refrigerators, toilets and other water systems, including cooling towers, all need to have water turnover. Some of these can require specialized attention. Faucet aerators should be removed because they accumulate materials and slow down the flow.

How long flushing takes depends on the building's piping design, devices and the speed of water exiting the faucets. All buildings are [different](#).

It took more than [80 minutes](#) of flushing to draw fresh water to the farthest faucet of one 10,000-square-foot building. In another building, it took [60 minutes](#) just to get fresh water from the water meter to the basement of a building 30 feet from the street. A single large building may take [hours or days to clear](#).

Easier to avoid contamination than clean it up

For building managers who haven't been running the water during the pandemic, the water sitting in pipes may already have significant problems. To perform flushing, safety equipment, including [masks](#), currently in [short supply](#), might be needed to [protect workers](#).

A [slow "ramp-up" of the economy](#) means buildings will not reach normal water use for some time. These buildings may need flushing again and again.

Shock disinfection, adding a high level of disinfectant chemical to the plumbing to kill organisms living in it, may also be necessary. This is required for [new buildings](#) and is sometimes done when water in new buildings [sits still for too long](#).

Inexpensive chemical disinfectant tests can help determine if the water is "fresh." Testing for harmful organisms is recommended by [some organizations](#). It can take several days and requires expertise to interpret results. Metals testing might be needed, too. Public health departments can provide specific recommendations for all of these actions and communication of risks.

The need for standards and water safety

Water left sitting in the pipes of buildings can present serious health risks.

Standards are lacking and very much needed for restarting plumbing and ensuring continued water safety after the pandemic passes.

Right now, building managers can take immediate action to prevent people from becoming sick when they return.