

## *After Coronavirus, Office Workers Might Face Unexpected Health Threats*

Stagnant plumbing systems in emptied commercial buildings could put returning employees at risk of Legionnaires' and other illnesses.

By Max Horberry

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When you finally return to work after the lockdown, coronavirus might not be the only illness you need to worry about contracting at the office.

Office buildings once filled with employees emptied out in many cities and states as shelter-in-place orders were issued. These structures, normally in constant use, have been closed off and shut down, and health risks might be accumulating in unseen ways.

"The buildings aren't designed to be left alone for months," said Andrew Whelton, an associate professor of civil, environmental and ecological engineering at Purdue University.

Dr. Whelton, other researchers and public health authorities have issued warnings about the plumbing in these buildings, where water may have gone stagnant in the pipes or even in individual taps and toilets. As lockdowns are lifted, bacteria that build up internally may cause health problems for returning workers if the problem is not properly addressed by facilities managers. Employees and guests at hotels, gyms and other kinds of buildings may also be at risk.

The biggest worry is *Legionella pneumophila*. The bacteria can cause Legionnaires' disease, a respiratory condition. It leads to death in about one in 10 cases, according to the Centers for Disease Control and Prevention. The National Academies of Science, Engineering, and Medicine estimates that over 52,000 Americans suffer from the disease each year.

A single small outbreak can sicken many people. During the water crisis that started in Flint, Mich., in 2014 after the city changed its water source and officials failed to inform the public of water quality problems, many people became sick. The crisis was linked to the deaths of 12 people from Legionnaires' disease.

After an outbreak at the North Carolina Mountain State Fair last September, 135 people contracted the disease and four died, according to the state's department of health and human services. Investigators blamed a hot tub exhibit that sent *Legionella* through the air and was inhaled by passers-by.

Most worrying, Legionnaires' disease tends to affect people with compromised immune systems.

"Covid patients and survivors could be more vulnerable to this, so when they go back to work we might be concerned about another infection," said Caitlin Proctor, a postdoctoral fellow at Purdue who, along with Dr. Whelton conducted a study that has been accepted for publication in the journal *AWWA Water Science* examining risks from water stagnation during the coronavirus lockdown.

Once forming in a building's plumbing, *Legionella* can be dispersed through the air when toilets are flushed. Even turning on taps, as employees wash their hands to limit the spread of the coronavirus, can send water droplets into the air that carry *Legionella*.

Typically, facilities managers reduce the risk of *Legionella* and other bacteria by pouring small amounts of disinfectant into a building's water systems. But when the water is left stagnant for too long, the disinfectant disappears.

"Even just after a weekend, disinfectant can be gone in some buildings and the water is vulnerable to contamination," Dr. Whelton said.



Legionella pneumophila, the bacteria that causes Legionnaires' Disease. Janice Haney Carr/Centers for Disease Control and Prevention

Facilities staff can also flush out old water and bring in a new and fresh supply. Or they can send a high dose of disinfectant through the building and raise temperatures to kill the microbes.

Shutdowns in the U.S. began in mid-March, meaning some buildings have now been closed for two months. And the researchers say that the consequences of long-term water stagnation are relatively unknown.

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“We haven’t really done studies on monthslong stagnation,” said Dr. Proctor. “The ecological system may change. So while we’re looking at these organisms, maybe other organisms pop up.”

William Rudin, C.E.O. and co-chairman of Rudin Management Company which manages 16 commercial office buildings in New York, said his staff is being careful and cautious in their approach to reopening.

“Our engineers go through the building testing systems all the time,” he said. “That’s standard procedure.”

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One problem for some property managers may be inconsistent and incomplete guidance from regulators and health authorities. Dr. Proctor and Dr. Whelton’s study assessed 21 sets of guidelines developed around the world since the pandemic began, including the C.D.C.’s and 11 from states and counties.

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If air travel is unavoidable, there are some steps you can take to protect yourself. Most important: Wash your hands often, and stop touching your face. If possible, choose a window seat. A study from Emory University found that during flu season, the safest place to sit on a plane is by a window, as people sitting in window seats had less contact with potentially sick people. Disinfect hard surfaces. When you get to your seat and your hands are clean, use disinfecting wipes to clean the hard surfaces at your seat like the head and arm rest, the seatbelt buckle, the remote, screen, seat back pocket and the tray

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“Not all of the guidelines are created equal,” said Dr. Proctor. “The original C.D.C. guidelines only covered certain systems.”

Because the effects of long-term water stagnation are so little understood, most of the guidelines are based on preventive measures and may not directly address reopening after long-term shutdowns.

“They all go different ways,” said Michèle Prévost, a co-author of the study and the industrial chair of drinking water on the Natural Sciences and Engineering Research Council of Canada. “It’s not ill-intended, there’s not that much evidence to guide our choices.”

Unfortunately many of the public health officials who would normally be tackling these issues and getting information out are currently focused on responding to the spread of the coronavirus.

“Health officials are overstretched and have conflicting information,” said David Dyjack, executive director of the National Environmental Health Association. “Health officials simply cannot keep up. Public health is being asked to do things it’s never had to do before.”

Even if only a small portion of buildings have problems, with so many reopening at once, the researchers fear there will be more outbreaks than usual.

“Not every building will have issues but based on what we know, enough of them probably will,” Dr. Proctor said.

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