

## Common Waterborne Pathogens

### DESPITE IMPROVEMENTS IN WATER QUALITY, PATHOGENS REMAIN A RISK

The quality of the US water supply is considered to be among the highest in the world.<sup>[1]</sup> Yet every year, large numbers of Americans are stricken by illnesses caused by waterborne pathogens. In 2017, these ailments resulted in 477,000 emergency room visits, 101,000 hospitalizations, and 6,939 deaths.<sup>[2]</sup> And that's only a partial picture, because it doesn't include visits to family doctors or cases that weren't severe enough to require medical care at all. The total number of cases is likely far higher, probably in the millions. But even though this data isn't complete, there's enough information here to make the point that waterborne pathogens are a serious, ongoing threat to public health. Building owners and managers need to recognize the most common pathogens and have plans to control their spread.

### TYPES OF PATHOGENS

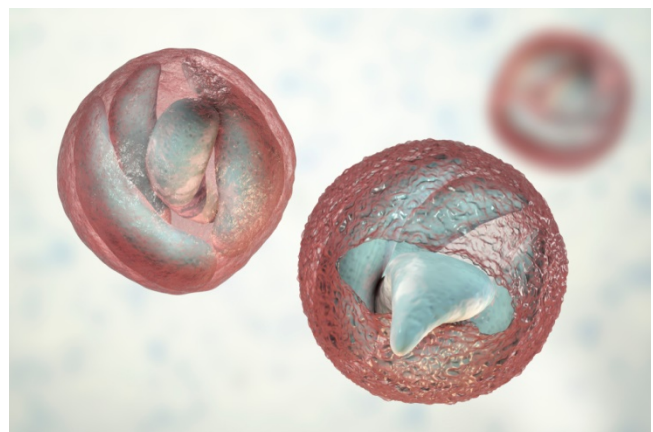
*Waterborne pathogens* are micro-organisms that thrive in water and can cause disease in humans. They come in a variety of forms, including bacteria, fungi, protozoa, viruses, and worms. Their natural habitats are bodies of water such as lakes, ponds and rivers, but they can exist anywhere water is found. That includes man-made water systems like reservoirs, swimming pools, hot tubs, outdoor fountains, indoor plumbing and air conditioner cooling towers. Humans become infected by bathing or swimming in the water or by drinking or eating something that's been tainted with it. In some cases, they can also be infected by breathing air that contains contaminated water molecules.


There are many waterborne pathogens and each causes its own variety of illness. In the following section, we'll focus on five of the most common pathogens.

### CRYPTOSPORIDIUM

We'll begin with *cryptosporidium*, a microscopic parasite that causes gastrointestinal illness in humans and other animals. It attacks the small intestine, where it causes symptoms such as watery diarrhea, stomach cramps, dehydration, nausea, vomiting and fever. These symptoms generally last up to two weeks, but could last longer and be more severe for people with weakened immune systems.

Infected hosts spread the parasite through their bowel movements. The tiny organism has developed a protective shell that allows it to live for extended periods without a host body. It can survive in many places: in soil, on edible plants, on food and in water. The protective shell also provides a tolerance against chlorine, which allows the parasite to survive in treated water systems.





New hosts become infected by swallowing something that's been contaminated with the parasite, such as unwashed fruits or vegetables or a tainted beverage. Humans can minimize their risk of infection by washing their hands before meals, after working with animals, or giving care to babies or older adults.<sup>[3]</sup>

## GIARDIA

*Giardia* is another example of a waterborne parasite. It causes an illness known as *Giardiasis*, which is the most common parasitic intestinal disease in the US. Symptoms include diarrhea, gas, greasy stools, abdominal cramps, nausea, and dehydration. An infected person can experience symptoms for as long as six weeks.

Like *Crypto*, *Giardia* is also spread through bowel movements. When it leaves the host, the parasite is encased in a protective shell called a cyst, which allows it to survive for months outside of a host body. It also provides resistance to chlorine, which allows it to survive in swimming pools and other treated water systems.



The most common way for a person to contract *giardiasis* is through drinking contaminated water, but the disease can also spread through contaminated food or person-to-person contact. The best ways to stay safe are to practice good hygiene, keep your mouth closed while swimming, and drink water from safe, public water sources.<sup>[4]</sup>

## LEGIONELLA


*Legionella* isn't the most common pathogen in this list, but it's probably the best known, thanks to the notoriety surrounding *Legionnaires' Disease*. It's a common bacterium normally found in fresh water environments like ponds, lakes and reservoirs. Unfortunately, it fares equally well in man-made structures such as the cooling towers of building air conditioners, showerheads and sink faucets, hot tubs that aren't drained after each use, decorative fountains and water features, hot water tanks and heaters, large plumbing systems and other water systems. And though the bacterium is relatively harmless in a natural setting, in enclosed environments it can cause *Pontiac Fever* or *Legionnaires' Disease*.



Pontiac Fever and Legionnaires' Disease are respiratory infections that exhibit flu-like symptoms. Both are caused when a person breathes air that's been contaminated with *legionella* bacteria, perhaps from the aerosolized water from an infected showerhead or cooling towers (structures that contain water and a fan as part of centralized air cooling systems for building or industrial processes). According to the CDC, about 15 out of 100 people who get Legionnaires' disease will die from the infection.

The number of *legionellosis* cases reported to the Centers for Disease Control and Prevention has been on the rise since 2000. Health departments reported nearly 10,000 cases of Legionnaires'





disease in the United States in 2018. However, because Legionnaires' disease is likely underdiagnosed, this number may underestimate the true scope of the problem. Most infections occur in the summer and early fall, but cases can occur at any time during the year.<sup>[5]</sup>

## MYCOBACTERIA

*Mycobacteria* refers to a *genus* (group) that comprises multiple species of bacteria, including the ones that cause Tuberculosis and Leprosy. The other species in the group are capable of causing lung diseases that are different from tuberculosis. Those species are classified as *Nontuberculous Mycobacteria (NTM)* and the diseases they cause are referred to as *NTM Lung Disease*.



Mycobacteria are capable of existing in multiple environments, including soil, water, and animal and human hosts. Those that are waterborne are capable of creating *biofilms*, which are collections of microorganisms that come together to form what looks like a thin, translucent film. These films can damage building water systems by fouling pumps or blocking water flow. They can also stick to the waterside surfaces of interior pipes, where they become a breeding ground for corrosion.

Mycobacteria are exceedingly common. Most of us breathe them in every day without issue. But they can be a real threat for older people, those with weakened immune systems, or those who already have an underlying lung disease.<sup>[6]</sup>

## PSUEDOMONAS


*Pseudomonas* is another genus of disease-causing bacteria. Like the other pathogens we've discussed, the species of this genus can also survive in soil, in water, and on plants. They can also be found in indoor plumbing systems. In that context, they can become a serious problem for healthcare facilities.



The species of *Pseudomonas* that effects humans most often is *Pseudomonas aeruginosa*. It can cause serious infections in the blood, lungs, or other parts of the body. It's particularly dangerous in hospital settings, where patients already have weakened immune systems. To make matters worse, this particular pathogen has developed a resistance to many antibiotics, which makes it increasingly difficult to treat. It's difficult for patients in a hospital setting to protect themselves from these secondary infections, so that responsibility falls to the facility staff. The best approach is to keep patients from becoming infected in the first place. That puts the responsibility on the water system managers for those facilities to be especially vigilant in monitoring and treating for this pathogen.<sup>[7]</sup>

## CONCLUSION

Hopefully, this introduction to waterborne pathogens has given you an understanding of the types of pathogens that exist in our water systems and the risk they pose to public health. Unfortunately, the



five we discussed are just the tip of the iceberg. If you'd like more information, or need help in dealing with any of the ones discussed in this article, please give us a call here at Solid Blend. Our experts are ready to assist with all your water management needs.

## REFERENCES

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