



# Be Aware of Waterborne Pathogens



Dr. Darin Ingels, ND

Mold Week! on Women's Wellness Radio

After a flood, the biggest thing we have to watch out for is the fact that mold is going to be a long term problem. In the short term we have to watch out for the fact that the sewer system gets flooded and carries all that contaminated water into people's home and contaminates their walls, furniture, and anything that may make contact with that water.

Water entering flooded homes is highly likely to be contaminated with sewage water and in that you get a lot of what we call Coliform Bacteria. These are the bacteria that would normally live in our gut. E.coli is the one that people are most familiar with. So people have to be very careful about any kind of contact that you have with that contaminated water because ingestion would get it into your mucous membrane.

## **Cleaning Up After a Hurricane**

Anyone doing cleanup has to be very careful in protecting him/herself so as not to accidentally ingest the bacteria and get it into the mucous membrane. Think also about open cuts and wounds being a great entry source for these kind of bad bacteria that cause infection.

That is one of the biggest health risks, right now, post hurricane Harvey. Even after the water recedes, the bacteria are still going to live on the surfaces that they touch; whether on walls or furniture. As the process of decontamination starts everyone has to be very careful to make sure that they take proper measures to protect themselves so they don't accidentally pick up these bacteria.

How long the bacteria stay in the water depends on the type of bacteria. They can stay for weeks to months if the environment is right. The reason they proliferate so much in our gut is because of the warm damp environment; there's water and fuel source. So as long as these bacteria have some damp environment and some element of fuel, they can continue to grow.

Part of the process of helping to get rid of these bacteria is trying out different things. The best thing anybody can do when they go in to clean up their home is to get a dehumidifier and try to get that moisture out of the air. Bacteria don't like dry environments.

In the human body, you really can't get throat or ear infections if your mucous membrane is dry. What happens when you get an allergy and start getting the clear fluid is that you now have a good breeding ground for bacteria. And when you do get exposed to the bacteria it grows very rapidly by itself. So if we start by drying out these environments it's going to be easier to clean up and there's going to be less likelihood of getting these types of bacteria.

## **Bacteria Post Hurricane Katrina**

Looking back to post Katrina, E. coli was really a big issue, as well as MRSA which is very resistant and highly contagious and can naturally eat away at the flesh in certain phases. There were also a lot of staph infections. Staphylococcus is a type of bacteria that causes a lot of skin infections.

There was also an organism called Vibrio, which in the olden days used to cause Cholera, a very dangerous gastrointestinal disorder. Now there's a different species of Vibrio that we see after a hurricane. It's not the same organism that causes Cholera; *vibrio cholerae* is what causes cholera. *Vibrio parahaemolyticus* is a different organism that can cause gastrointestinal infections.

There were a lot of skin infections seen mostly in the people who were doing the clean up after hurricane Katrina. So there are bacteria common in flooded environments that people need to be aware of.

## **Over-Flooded Sewers**

Most sewer systems are all tied into a treatment plant so whether it's sewage that leads out of your house when you flush your toilet or the sewage on the side of the street that collects rain water, all that water is essentially contaminated water. It all goes to a central treatment plant where the water is sterilized, purified and then can get reprocessed into potable water that we can drink and use.

So when a city gets flooded, the excess water gets into the sewer lines and long canals and they fill up. That water then floods back up the other direction and gets spread, all over, as the water rises.

This has been the case after every major storm where every sewer system has a capacity to how much water it can hold before it overflows. It's just the same as the toilet overflowing, only that it's on a much larger scale.

## Dam (Lake) Water Organisms

Lake water has its own set of organisms that are a little bit different from what we would find in sewer systems. There are certain bacteria and parasites that can live in lakes or fresh water rivers that we wouldn't necessarily see in the sewer system.

The reality is that in lake water animals tend to poop near water so lake water can be contaminated with the bacteria that we would normally see in the gut. In many cases the animal gut is not so dissimilar from our own gut, so we see a lot of the same bacteria.

But there are other types of parasites that you might find in lake water but you may not necessarily find in sewer water like *Giardia* and *Entamoeba histolytica*. A lot of animals can be carriers for these parasites and if they happen to poop near that water supply that could contaminate the water.

There's another parasite called *Naegleria*, commonly found in fresh water sources. Even swimming in a lake periodically could cause an infection of that particular parasite because it gets pretty easily into your mucous membranes. So getting flooded with dam water will cause its own set of microbial problems.

## Bacteria & Parasites in the Home

Parasites need a host to live on and will not survive long in the open like bacteria because without a fuel source they'll essentially start to die out. But they can still survive for a decent length of time (days even up to a week or two) depending on where they are located within the home.

There is also a parasite called *Cryptosporidium*. Outbreaks of this parasite can get into the water supplies because this is water that's contaminated that didn't get treated properly in the treatment plant. The water then gets recirculated back into people's homes.

Most people get these parasites through ingestion. So it's something you'd have to touch with your hands and then put your hands to your mouth and ingest it. Bacteria also tend to be transmitted through ingestion and can also get through an open wound. So protecting yourself as you're doing the cleanup is a very effective way to reduce your risk of getting any of these kinds of microbial infections.

It's good to be aware that it might be different for someone whose house may still be flooded versus a situation where the water is completely receded. The risk is probably higher when you're working in a flooded area. So you should wait until the water recedes before getting in and doing repair works. That by itself will reduce the risk.

Ripping out old material is also a potential health risk because of the bacteria, parasites and even viruses in these areas. So imagine you start ripping out wet-dry walls and insulation

and flipping it about; that will kick up some dust and since these bacteria can live on dust particles you breathe them in.

So ensure that you wear a mask. Dr. Ingels specifically recommends a mask called N95 mask that has a very high particulate filter and keeps any microbes from getting in.

## **What Needs to Be Thrown Away?**

Anything that is porous needs to be thrown away.

Anything made of glass or metal can be cleaned and decontaminated but anything that's porous can't because microscopic amounts of microbes or mold can get into these areas. And if you just wipe off the surface you wouldn't necessarily know that there's a problem. Dr. Darin Ingels has seen people who've lived in water damaged homes before only to find out months or years later that they have mold issues.

If you've got books, chairs, couches and anything porous that's come into contact with water, you're better off throwing it away. Books tend to hold a lot of mold spores. This is because even if they were in another room where there wasn't flooding, because of so much moisture in the air mold can grow.

Clothing can be washed & salvaged, although you may need to wash them several times to get them clean. And if the water damage has been relatively short term then just cleaning the clothes is usually adequate to reduce the risk. In the long term situation, mold can emit a lot of toxins. You therefore need to do a proper clean up and make sure that you're not leaving anything behind that might continue to contaminate the home. It takes time for you to get your home put back together so it would be unfortunate to spend all that time, money and effort only to find out a year down the line that you're having mold issues because it wasn't properly addressed from the get go. It's better to get rid of it while it is in your home since you definitely wouldn't want it in your body because then it would be harder to get it out.

It's heart breaking and hard to get rid of things you own that are personal and meaningful to you but it's better to act and make good decisions for your health. At the end of the day your health is the most important thing. Be honest with yourself as to what is salvageable and what is not. Holding on to something that might potentially cause a problem for you down the line is just not worth it!

## **Parasites**

Parasites are quite common in the United States but we may not be aware of them as much as other countries.

After hurricane Katrina, there were reports of hookworms. A hookworm is technically called *Necator americanus* and it is a parasite you can get through the skin; it doesn't necessarily have to be ingested.

Studies have found that, particularly in areas of poverty where people walked around barefoot after the storm, the parasite was literally burrowing through their feet and making its way to the intestines and liver. So you can end up with an intestinal parasite even if you've never ingested it.

Normally you wouldn't know that you're getting infected because these parasites are microscopic (very small). And this is where wearing proper protection when doing clean-up, especially if there is stagnant water present, is very important. You want to get the right suit and rubber boots to protect yourself from any of that exposure and contamination, giving these parasites a route of entry.

## Gut Parasites

Our microbiome is comprised of a lot of different microbes - bacteria and viruses. They are parasites which are part of our normal flora. And if you look at countries where parasites are still commonly found and get into the food supply, allergies, asthma and autoimmune diseases virtually don't exist. There's been some good research showing that eradication of parasites has actually led to other types of health issues.

But just like everything else there are good parasites and bad parasites. There are some that we would get exposed to as humans that don't really cause diseases in us, like the rat tapeworm, which we used to ingest from eating grains. It can't cause disease in humans but it can help modulate the immune system. Other good parasites can help in modulating our gut function.

It's wise to have a little medicine chest or tool kit of things you can keep on hand and take to keep their immune system in check and primed in the process of cleaning up your home.

## What's in Your Medicine Chest?

Dr. Ingels recommends the following:

1. **Vitamin C** – there's been a lot of research on vitamin C as an immune stimulant that activates different parts of the immune system to help prevent infection. And depending on your age and size, 1000mg 2 or 3 times a day for most people (both adults and children) is well tolerated. If you get too much of it you'll know because it will give you a little bit of loose stool.
2. **Vitamin A** - supports part of your immune system called secretory IGA. These are antibodies that line all of your mucous membranes - nose, throat, intestinal tract. This is your barrier to the outside world. If you can keep that part of your immune system happy, then when you do get exposed to the harmful bacteria that come into

contact with your mucous membranes, your immune system can act a little faster and will help prevent it from getting deeper into your body and causing a bigger problem.

Vitamin A is a great nutrient but you have to be very careful on the dose; there is such a thing as Vitamin A toxicity. For any adult working though this, 25,000 IUs a day and for children 10,000 IUs a day will do. And you want to take vitamin A with food because it's a fat soluble vitamin so you need a little bit of fat to absorb it.

3. **Vitamin D** - this is actually a hormone and plays a very important role in immune modulation. Even if you live in sunny Texas where you feel like you're getting a lot of sun exposure, you can still be low in vitamin D because of wearing sun block and clothing that blocks the sun from helping make vitamin D.

We also get very little to no vitamin D from food so we do depend on the sun's exposure for making it. For the average adult 4000-5000 IUs a day and for a child 1000-2000 IUs a day will do. You also want to take it with food.

4. **Zinc** - is great because it stimulates a very specific part of the immune system that directly goes after infections. It is an anti-viral so in the event that you get exposed to any kind of virus along the way, it has direct anti-viral effects. For adults anywhere from 30-50mg a day and for children 10-20mg a day will do.

You want to take zinc with food, not necessarily for absorption, but because zinc on an empty stomach can make you pretty nauseous.

## Mosquitoes

Because you're in a very humid environment, you get a lot of mosquitoes naturally and with all the stagnant water you're going to see this massive explosion of mosquitoes. This is because there are so many places they can lay their eggs. So keeping some sort of natural repellent on hand will be a good idea just to keep the mosquitoes away from your skin.

Although mosquitoes don't usually transmit bacterial or parasitic infections, we do see outbreaks of viral infections after natural disasters. Currently there's the Zika virus, West Nile virus, Dengue virus, and even one that's emerging out of Central America called Chikungunya virus. Zika and West Nile are probably the two viruses the health departments are most worried about in the United States. Fortunately we have very few cases of them in the US but with this potentially growing mosquito population, then it's something we need to keep on our radar.

It's preferable not to use the products that have toxic chemicals used to keep mosquitoes away. There are a lot of great natural organic essential oil products available that typically contain any combination of clove oil, eucalyptus oil, tea tree oil, cedar oil, lavender oil or lemongrass oil.

Studies and research done found that these oils actually work in keeping the mosquitoes away. If you have access to essential oils, you can make your own concoction since there are many recipes online for doing that. Most of the health food stores do carry some version of this. Pick up a bottle and spray yourself regularly while you're in that environment and make sure that you're doing all you can to keep the mosquitoes at bay.

## **Can Lyme be Transmitted by Mosquitoes?**

It has been proven in research to be the case. There are at least 4 studies out of Europe that have shown that mosquitoes can transmit Lyme disease. Ticks carry most of the Lyme but it's not just them. There's been some evidence now that mosquitoes and potentially even fleas could carry Lyme.

This makes sense because there are people around the world who don't live in areas typically known to have ticks and yet they have positive Lyme tests, and they haven't even travelled to areas that are endemic for Lyme. So it would make sense that there are other potential carriers.

It's good to use a natural repellent, wear long sleeves and stay in after dark. And with stagnant water, you can try moving it around for example by using it to water the flower pots. Rearrange water flows outside your home to do away with the stagnant water. Mosquitoes don't travel far and like to stay relatively close to home (stagnant water). Even inside your home, if you've got those little puddles, you need to dry them out.

## **Safe Drinking Water**

Make sure that you have some sort of potable water because you may not know to what extent your tap water was contaminated. Make sure that your water is safe before drinking or even bathing in it.

There are various labs you can use to test but in the meantime either use bottled water or boil your tap water because it will help kill off a lot of the bacteria. But boiling alone won't necessarily get rid of any toxins that might be in the water; it only kills the bacteria so it's not the safest way.

You can also buy the little personal water containers with water filters designed for campers so that they can pull water from a stream and basically sterilize it so it is safe to drink. This may be a worthy investment to make sure that the water you drink is clean.

Also, even if your home wasn't damaged that doesn't mean that your water supply wasn't contaminated. Check with your local officials or call whoever is involved with your local water treatment and talk to them to make sure that the water is safe to drink and bathe in.