



Protection from Waterborne Zoonotic Diseases
National Center for Foreign Animal and Zoonotic Disease Defense

Disasters that involve flooding are well-known sources of disease and are of great concern to public health officials. In addition to the commonly recognized waterborne diseases of typhoid, cholera and dysentery, a large host of infectious zoonotic organisms (those that can pass from animals to humans) may be encountered in flood-contaminated waters. Human disease has resulted from different kinds of water exposure: by drinking it, inhaling splashes or mists, having contaminated water enter through a wound, or having it splashed into the eyes, nose or mouth. However, the most common risk is from drinking contaminated water.

The following is a list of some of the disease-causing zoonotic organisms that have been reported or known to cause infection in people after exposure to contaminated water or food.¹⁻⁷

Bacteria

- [Leptospira](#)⁸ (the most common zoonosis worldwide)⁷
- [Mycobacterium avium complex](#)⁹
- [Pseudomonas](#)¹⁰
- [E. coli](#)¹¹
- [Vibrio](#)¹²
- [Salmonella](#)¹³
- [Campylobacter](#)¹⁴
- [Francisella tularensis](#)¹⁵

Parasites

- [Giardia](#)¹⁶
- [Toxoplasma](#)²
- [Cryptosporidium](#)¹
- [Microsporidia](#)¹⁷
- [Isospora](#)¹⁸
- [Cyclospora](#)⁶
- [Balantidium](#)¹⁹
- [Entamoeba](#)²⁰
- [Blastocystis](#)²¹
- [Schistosoma](#)²²
- [Fasciola](#)²³
- [Toxocara](#)
- [Strongyloides](#)²⁴
- [Taenia](#)²⁵

TO PROTECT AGAINST WATER-BORNE ZOOONOTIC DISEASES DURING TIMES OF NATURAL DISASTER WATER TO BE USED FOR DRINKING, COOKING, MAKING ANY PREPARED DRINK, OR BRUSHING THE TEETH SHOULD BE PROPERLY DISINFECTED.

Bacteria and parasites inside solid particles of soil, etc., are harder to kill than bacteria in the water itself. If the water source is cloudy or muddy, first clarify the water by letting it settle. Course materials, like sand, will settle in a few minutes. Finer particles, like silt and clay, will take much longer. After most of the suspended particles have settled to the bottom of the container, gently pour the clear water off the top into a second container being careful not to agitate the liquid more than necessary. Alternatives to pouring the clear liquid off the top would be to gently draw the clear water off with a basting bulb or siphon it into a clean container with a length of tubing. This water should then be filtered by pouring it through a clean cloth or other filter media such as coffee filters. Store the filtered water in clean containers and disinfect it by boiling or by chlorination.²⁶

Boiling is the most effective means of disinfecting water. A rolling boil **for one minute** kills disease-causing organisms. Any heat source, such as an electric, gas or backpacking stove, wood stove or fire of any kind can be used to boil water. Even microwave ovens can heat water to boiling if electricity is available.



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When boiling is not practical, chemical disinfection should be used. The two chemicals commonly used are household chlorine bleach and tincture of iodine from the home medicine chest. Chlorine and iodine are somewhat effective in protecting against Giardia, but may not be effective in controlling Cryptosporidium. Chlorine is generally more effective than iodine, and both disinfectants work much better in warmer water.^{27,28}

Volume of Water	Number of Drops* of Tincture of Iodine	
	Clean Water	Cloudy Water
One quart	5	10
One gallon	20	40
Mix water thoroughly and let stand for 30 minutes.		
*5 drops = 1/3 of 1/8 teaspoon 10 drops = 2/3 of 1/8 teaspoon 20 drops = 2/3 of 1/4 teaspoon 40 drops = 1/4 teaspoon plus 1/3 of 1/4 teaspoon		

Available Chlorine in Bleach	Number of Drops* of Chlorine Bleach to Disinfect One Gallon of Water	
	Clean Water	Cloudy Water
5.25%	8	16
Mix water thoroughly and let stand for 30 minutes.		
*8 drops = 1/2 of 1/8 teaspoon 16 drops = 1/8 teaspoon		

The source of the above charts may be found at <http://ohioline.osu.edu/aex-fact/0317.html>.



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