

What health risks do humans face from polluted oceans? ^[1]

Dear Alice,

Seems like the only health risks you read about in the news is from eating tainted fish or from getting an infection when swimming in the ocean. Are there other direct effects on our health posed by pollution in the ocean?

Answer

Dear Reader,

The alluring crash of waves on a white sand beach is a pretty idyllic image for many. However, the ocean and its sandy shores may also hide some health risks. Many disease outbreaks have been linked to waterways such as pools, water parks, rivers, and oceans. In short, much of the risk from polluted water comes from eating the fish and other organisms that call the polluted water home, as well as coming into contact with the bacteria that thrives in these polluted bodies of water. A key to understanding how pollution might make you sick is considering causes of water pollution such as algal blooms, polluted runoff from rainfall, and plastic, which all come with their own implications for human health.

One of the most costly and uncontrolled environmental problem facing the Earth is nutrient pollution. Given that nutrients are usually considered a positive, this may seem odd at first. However, the level of natural nutrients in the atmosphere, such as nitrogen and phosphorous which support the growth of algae, might get out of hand and grow too much. Overgrowth of algae, due to an overabundance of nitrogen and phosphorus in the environment, have the potential to create harmful algal blooms (HAB), which deplete the oxygen in the water. In turn, this could lead to illness and death of fish living in this environment, increased toxins and bacterial growth in the fish and water that are ingested, or increased risk of exposure to toxins.

An example of a well-known HAB are the Florida red tides, which is caused by *Karenia brevis*. The overgrowth of these photosynthetic organisms (organisms capable of turning sunlight into fuel) increases production of toxins that get incorporated into the water and air in the form of aerosols potentially causing:

- Respiratory irritation such as coughing and sneezing

- Shortness of breath
- Throat, eye, and skin irritation

List modified from the [Centers for Disease Control and Prevention \(CDC\)](#) [2].

You have probably seen signs near the ocean stating, “swim at your own risk.” If these signs go up after a heavy downpour of rain, it might not be due to a strong rip tide. After a rainfall, polluted runoff and untreated sewage end up in the ocean in large quantities. This is why beach monitoring programs take samples of the ocean waters after heavy rain, to check for harmful bacteria, viruses, protozoa, and parasites that could make someone sick. After a few days (about 72 hours), most the harmful organisms are dispersed, eliminated from ultraviolet rays, killed by the saltwater, or consumed by other microbes. If you decide to brave the waters anyway, a common illness caused by polluted water is gastroenteritis (a stomach bug usually caused by *Salmonella*, *E. coli*, or Norovirus). This most often is associated with symptoms of nausea, vomiting, stomachache, diarrhea, headache, and fever. Swimming in dirty water may also result in infections that affect the eyes, ears, nose, and throat.

In addition to bacteria and algae, plastics are a major source of pollution. Scientists estimate that about two-thirds of plastics ever created are still in the environment. Many of these plastics find their way into the ocean, particularly in the form of microplastics (very small particles of plastic that may not be visible). Bacteria are able to grow and live on the surfaces of microplastics, which are often so small you can't see them floating in the water. These bacteria are shown to cause human illnesses such as gastrointestinal infections. It doesn't stop there, as studies have shown that harmful contaminants in plastics may actually enter the body's most sensitive areas, including the bloodstream, cerebrospinal fluid, and lungs. The accumulation of microplastics and their contaminants have the potential to contribute to tissue damage and inflammation in the body, which could result from contact with toxic and infectious agents in polluted waters.

Pollution makes its way into the ocean in many forms and affects water that people swim in, drink from, and breathe near. Therefore, it may be helpful to discuss some fairly simple actions that can be taken to prevent getting sick from water pollution and decrease your risk of infection. For starters, it can be helpful to avoid any body of water that:

- Smells bad
- Looks discolored
- Has foam, scum, or algal mats on the surface
- Contains or is near dead fish or other dead animals

List modified from the [CDC](#) [3].

Furthermore, it can be wise to check the local environmental health website for beach closures or places that are experiencing HABs. If any pets that end up taking a dip, make sure to rinse them off with fresh water before letting them back indoors. If swimming despite environmental warnings, then it's best to try and avoid swallowing water and keeping any open cuts or wounds covered. Although you may be aware of the risk of eating contaminated fish, more information on this topic might be found on the [Environmental Protection Agency fish advisory website](#) [4].

If you will, take a moment to revisit that scene of waves crashing on a white sand beach. Many

want to keep that image free of pollution and, in turn, humans free of infection and illness. If you have that same goal, you may be interested in ways to reduce ocean pollution through organizations such as the [Ocean Conservancy](#) [5]. Your question brings up a good discussion about environmental conservation and its connection to human well-being. Cheers to an unpolluted beach vacation in the future!

Alice!

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