

## WATER AND HUMAN HEALTH

### What does water have to do with human health?

Water is a basic human need. We need water to survive, and can only live for a few days without it. When we get sick with flu-like symptoms, we usually blame the food we ate as being the cause of our illness. In urban areas of developed countries, many people would never think to consider that they may have become ill from the water that they drank. But many people in developing countries, and people living in rural areas of developed countries (including many First Nations communities) do not take safe drinking water for granted. They understand the relationship that exists between safe drinking water and good health, because they have experienced waterborne disease firsthand.

That is not to say that urban centres have not experienced waterborne illnesses. In Milwaukee, Wisconsin, in 1993, an outbreak of *Cryptosporidium* killed 110 people and made around 403,000 people ill. In Walkerton, Ontario, in 2000, seven people died and around 2,300 people became ill when *E. coli* contaminated the local water supply. In North Battleford, Saskatchewan, in 2001, approximately 8,000 people became ill when *Cryptosporidium* contaminated a local water supply. The media focuses our attention on large waterborne disease outbreaks, such as these; but it is estimated that waterborne illnesses are responsible for over 90,000 illnesses and 90 deaths in Canada each year. Many of these are in small remote communities.

On a global scale, 1.1 billion people do not have access to safe drinking water and 2.6 billion people do not have access to adequate sanitation. 80 percent of all illnesses in developing countries are attributed to unsafe drinking water and the spread of waterborne diseases. There are 2.2 million deaths each year that result from unsafe drinking water, 90 percent of whom are children under five years of age.

### Bacteria, parasites and viruses:

Waterborne diseases can be spread by bacteria, parasites and viruses. The prevalent five diseases that are explored in detail in Operation Water Health are [Campylobacter](#) (bacteria), [Cryptosporidium](#) (parasite), [E. coli](#) (bacteria), [Hepatitis A](#) (virus), [Shigella](#) (bacteria) and [Vibrio cholerae](#) (bacteria), but there are also fact sheets with information about [Coxsackie B](#) (virus), [Giardia](#) (parasite), [Helicobacter pylori](#) (bacteria) and [Legionella](#) (bacteria).

Health Canada keeps track of some of these waterborne diseases, including the province in which they are found, and the age and gender of those who became ill. While the number of reported cases is broken down into provinces, it is not broken down any further, into urban, rural, First Nations or remote communities.

### How is water treated to make sure that there is nothing harmful in it?

There are a number of ways in which water can be treated to make it safe for drinking, but some methods are more effective than others. For example, *Cryptosporidium* is extremely difficult to inactivate, and chlorination is unable to inactivate *Cryptosporidium*. A typical water treatment facility uses a process of coagulation, sedimentation, filtration and chlorination to treat drinking water. For information about these forms of water treatment, see the [Conventional Water Treatment: Coagulation and Filtration](#) and [Chlorination](#) fact sheets. For information about water filters in Nepal, which use rusty nails to remove arsenic, see the [Filters for Families](#) fact sheet.

There is also a growing interest in other types of treatments, including UV Irradiation, Reverse Osmosis and Ozonation. For information about these treatment processes, see the [Ultrafiltration, Nanofiltration and Reverse Osmosis](#), [UV Irradiation](#) and [Ozonation](#) fact sheets. The resources and lesson plans in [Operation Water Drop](#) also provide additional information about the substances that water is tested for, and how these tests are done. The [Water Quality Tests](#) provide a thorough overview of 13 substances that water is commonly tested for, including the health effects that are associated with each one.

### How much is safe drinking water worth?

How much is safe drinking water worth to you? How much would you be willing to pay to know that the water that you drink won't make you sick? And how safe should the water be; does it need to be of a quality that one person in one hundred will get sick, one person in one thousand will get sick, or one person in ten thousand will get sick? Water is never risk free; there is always a small chance that it could carry something harmful. Water treatment plants generally treat the water to a quality where the chance of illness is minimized.

When governments and municipalities delegate funding to water treatment facilities, they must decide whether it is better to treat the water to make it safe, or risk having to treat the people who become ill from unsafe drinking water and all of the costs that are associated with waterborne disease outbreaks. Most cost-benefit analyses of waterborne disease outbreaks, such as the ones that occurred in Walkerton, Ontario and North Battleford, Saskatchewan, show that effective water treatment generally costs less than treating illnesses. For more information about the economic considerations of water treatment, see the [Cost-Benefit Analysis: Treat the Illness or Treat the Water?](#) fact sheet. The resources and lesson plans in [Operation Water Flow](#) also provide additional information about the economic costs associated with water.

### Human rights and consumption habits:

The average Canadian uses a lot of water; approximately 335 litres per day, to be more precise. Other than the Americans, who use an average of 380 litres of water per day, Canadians use the most water in the world! For more information about water consumption, see the [Water Consumption](#) fact sheet. Millions of people do not have access to safe drinking water, and many have to go to great lengths to obtain safe drinking water. Women have to walk for miles in dangerous conditions to obtain water. Private companies set up water meters and charge up to ten times more for water than it would cost for piped water, forcing families to choose between safe drinking water, food, education and health. Many people believe that water is a human right, but at United Nations conferences and meetings, the Canadian government continues to be the only country to consistently vote against water as a human right. For more information about water as a human right, see the [Human Rights](#) fact sheet. [The Cree Language, Ojibway](#) and [Inuktitut](#) fact sheets, as well as the resources and lesson plans in [Operation Water Spirit](#) also provide additional information about different perspectives of water, including the Aboriginal perspective that takes a much more holistic and sustainable approach to water.

### Bottled water: Safer than tap water?

Do you drink bottled water? Do you drink it because it's convenient and it looks cool, or do you drink it because your tap water isn't safe for drinking? There are a lot of current debates about whether tap water or bottled water is safer, and many scientists are coming to the conclusion that most urban centres can provide tap water that is just as safe as, or safer than, bottled water. Many resources are required to produce plastic water bottles, and the chemicals in the

plastic are unhealthy and cause great amounts of pollution. In addition, bottled water is expensive and many people believe that the bottled water industry is the beginning of the privatization of water. For more information about bottled water, including some things you should read before you decide whether you will drink bottled water, see the fact sheet titled [Bottled Water](#), and the articles called [Bottled or Tap Water?](#) and [Banned! Top chefs just say no to serving bottled water – and yes to helping the environment.](#)

### The impact of climate on waterborne diseases:

We live in a changing world. Most scientists are predicting global climate change over the next years; whether you believe in climate change or not, there are some important things about waterborne diseases and climate that can be learned. Think back to the last time you were sick; what month was it? The bacteria, viruses and parasites that carry waterborne diseases are found more often during the warm summer months than in the cold winter months. They can also be found in swimming pools and lakes and streams, which mean that more people are exposed to waterborne pathogens in the summer than in the winter. Heavy precipitation also increases the chances of water contamination, because stormwater can overwhelm sewer systems and flow into drinking water sources. Heavy precipitation was partially to blame for the contamination of the wells in Walkerton, Ontario. For more information about how temperature and precipitation are related to waterborne diseases, see [The Effect of Climate Change on Waterborne Diseases](#). The resources and lesson plans in the [Operation Water Pollution](#) also provide additional information about the ways in which water contamination can occur, and how the actions of one person or industry can impact the water quality further down the river or stream.

The Safe Drinking Water Foundation has educational programs that can supplement the information found in this fact sheet. Operation Water Drop looks at the chemical contaminants that are found in water; it is designed for a science class. Operation Water Flow looks at how water is used, where it comes from and how much it costs; it has lessons that are designed for Social Studies, Math, Biology, Chemistry and Science classes. Operation Water Spirit presents a First Nations perspective of water and the surrounding issues; it is designed for Native Studies or Social Studies classes. Operation Water Health looks at common health issues surrounding drinking water in Canada and around the world and is designed for a Health, Science and Social Studies collaboration. Operation Water Pollution focuses on how water pollution occurs and how it is cleaned up and has been designed for a Science and Social Studies collaboration. To access more information on these and other educational activities, as well as additional fact sheets, visit the Safe Drinking Water Foundation website at [www.safewater.org](http://www.safewater.org).