

What Is Diarrhea Anyway?

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STORY AT-A-GLANCE

- › Your digestive system is sensitive to dietary changes, and the health of your gut microbiome may predict your overall health and contribute to the formation of your stool
- › Research has discovered the process of diarrhea may help your body to flush out disease-causing bacteria from your intestinal tract, and stopping this process unnaturally may increase the severity and length of your illness
- › While deaths from diarrheal illnesses have decreased in low-income countries, they have increased in wealthier countries; overuse of antibiotics, increasing consumption of sugar and a focus on antibacterial wipes may contribute to the challenge

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Your digestive system is sensitive to dietary changes, and the health of your **gut microbiome** may predict your overall health and contribute to the formation of your stool. When bacteria and viruses invade your digestive system, problems may occur, the most common of which is diarrhea.

Although the condition typically doesn't last more than a few days, some bacterial infections may cause it to persist for a few weeks, increasing your risk of potentially serious complications. Factors that determine the length of time you experience diarrhea include your level of stress, the bacteria triggering the condition, your immune health and the health of your gut microbiome.

Diarrhea occurs when your body releases more water than normal with your stool, flushing the food and fluids rapidly through your digestive tract. Although the time food takes to digest varies from person to person, it normally takes between six and eight hours from the time you eat food until it reaches your small intestines. From there it travels to the large intestines and is finally eliminated. The average transit time is two to five days, depending upon age, sex and the type of food eaten.¹

Although uncomfortable and sometimes messy, diarrhea has a specific function. In the past, scientists believed it was a method of flushing out unwelcome bacteria from your gut more quickly, and thus lessening the symptoms of illness you may suffer. Researchers have sought to determine the biological mechanism. Study lead contact Dr. Jerrold Turner, from Brigham and Women's Hospital, commented:²

"The hypothesis that diarrhea clears intestinal pathogens has been debated for centuries. Its impact on the progression of intestinal infections remains poorly understood. We sought to define the role of diarrhea, and to see if preventing it might actually delay pathogen clearance and prolong disease."

The Definition of Diarrhea

Diarrhea is defined by both the consistency and frequency of your stool. Loose and watery bowel movements that happen at least two to three times in a 24-hour period is true diarrhea. This is a symptom that everyone has experienced at one time or another, and usually results in a larger volume of stool and more frequent trips to the bathroom than you normally experience. Other symptoms may include:^{3,4}

Bloating, gas	Light-headedness	Fever
Nausea, vomiting	Loss of appetite	Weight loss
Lower abdominal pain or cramping	Blood or flecks of mucus in the stool	Incontinence – leakage of stool

In many cases your increased loose stool is triggered by an infection caused by a bacteria, virus or a parasite. The most common cause of acute diarrhea in the U.S. may be attributed to several different types of bacteria: salmonella, Campylobacter, shigella or E. coli.⁵ In other cases diarrhea may be called "functional" as a clear trigger cannot be identified.

Types of functional diarrhea including irritable bowel syndrome or inflammatory bowel disease. Other causes of diarrhea include drugs, endocrine disease, cancer or malabsorptive disease, such as Celiac disease. There are three types of diarrhea that are defined by how long the condition persists:^{6,7}

- **Acute** – Lasting a short time, often between several hours to a few days
- **Persistent** – Continues for more than 14 days but less than 28 days
- **Chronic** – Persists longer than 28 days

The Process May Be More Complicated Than You Thought

A team of researchers investigated how water passes through the intestinal walls in order to create loose stools.⁸ The scientists used a mouse model infected with the human equivalent of E. coli, and examined the intestinal lining to analyze how large amounts of water passed from the body into the intestines, facilitating the formation of diarrhea.

They discovered that within one to two days after infection, changes occurred to the intestinal lining of the mice triggered by the production of a protein modulated by immune cells. These changes occurred days before inflammation in the gut from the bacteria became evident.⁹

The production of the protein interleukin-22 fused with the intestinal lining to produce another protein called claudin-2. This second protein organized the intestinal wall cells to form openings through which water could enter the intestines.

While past research has demonstrated activity of both interleukin-22 and claudin-2 in humans, the interplay between the two has not been found in humans during a bacterial infection. This suggested to the researchers that while diarrhea is a problem, without the loose, watery stools, the problem could be much worse.

The team then used three different sets of mice – one a control group, one engineered to overproduce claudin-2 and one group that did not produce claudin-2. All three groups were then infected. As expected, the control group got diarrhea and the overproducers always had diarrhea. However, what wasn't expected was how much the mice who were unable to produce claudin-2 suffered from the infection.

This third group of mice experienced greater **inflammation**, tissue damage and bacterial proliferation than the other two groups, and it took their immune system longer to clear the bacteria.¹⁰ In the end, this group of mice experienced diarrhea as well, when the intestinal lining broke down to allow more water into the stool to flush out the bacteria.

Don't Stem the Flow

The researchers point out that to date, this information has been demonstrated in animal models only and thus it may be too soon to generalize it to humans. However, humans do produce interleukin-22 and claudin-2, which may be responsible for triggering diarrhea during an infective process.

What the research does demonstrate is that any medications you may consider to block the action of the protein molecules, and stem the flow of acute diarrhea may actually be doing more harm than good. The diarrhea you experience may be preventing more serious or prolonged infections as it flushes bacteria from your intestinal tract.

Blocking the path of bacterial elimination using drugs may not be your best choice. Instead, consider dietary changes that may help rest your gut and improve the formation of stool. Increasing your indigestible carbohydrates – fiber – may help capture some of the excess water and structure your stool, without affecting the biochemical changes taking place in your intestinal lining that help to clear the infection.

It is also important to remember that while diarrhea may help reduce the severity of the infection, diarrhea can trigger serious health conditions when not properly supported. Your body is losing vast quantities of fluids that must be replaced to reduce the potential for dehydration, electrolyte loss and potential death. The best fluid to drink is structured or "living" water, such as what you may get from a deep spring.

This is the same type of fluid found in your cells. It has a negative charge and works like a battery by holding and delivering energy. Tap water is loaded with pollutants, chlorine and fluoride, and distilled water is too acidic. However, filtered, pure, structured water is in the ideal pH range of 6.5 to 7.5 and helps to nourish and restore your body to a balanced state.

You may find a spring in your area using the FindASpring.com website,¹¹ which covers the Americas, Canada, Europe, Asia and Africa. You may also consider using pure, filtered water at home and cooling it to 39 degrees F or using a vortex method of stirring the water in a circular cup with a spoon to add structure and energy to the water you drink.

Diarrhea Has Been a Death Sentence in Low-Income Countries

Since 2005, great progress has been made lowering the death rate from diarrheal illnesses in low-income countries. A collaboration of over 2,500 researchers called the Global Burden of Disease¹² works to track major causes of illness and death around the world. A study from this group published in the Lancet medical journal, reveals deaths related to diarrhea have declined across the world by about 20% for all ages and 35% in children under age 5.¹³

Lead author of the study, Dr. Christopher Murray, director of the Institute for Health Metrics and Evaluation, called this "really quite steady progress."¹⁴ Somalia experienced a 14% reduction since 2005; Niger, 40%; and Chad, a 24% reduction in deaths related to diarrhea.

According to the U.S. Centers for Disease Control and Prevention (CDC), diarrhea is the second leading cause of death in children under the age of 5 around the world.¹⁵ Death occurs when the condition depletes your body's fluid, resulting in profound **dehydration**. An adult body comprises about 60% water,¹⁶ necessary for cellular function. Severe dehydration occurs when you lose more than 10% of your body weight from fluid loss.¹⁷

Diarrhea not only increases the risk of death, but may also affect a child's cognitive development.¹⁸ Of those who die, 88% of the diarrhea is triggered by unsafe water and inadequate sanitation passing rotavirus to the individual, which is the leading cause of acute diarrhea in children, and 40% of the hospitalizations for diarrhea in children under the age of 5.

An unexpected trend was also discovered in the study. Wealthier nations around the world are experiencing an uptick in deaths from diarrhea in all ages. In the U.S., this increase was measured at a 25% increase in the number of people who die from diarrhea.¹⁹

The researchers attribute this increase to the inappropriate use of antibiotics, especially in the elderly who are at greater risk from diarrhea. The use of antibiotics has contributed to the rise of *C. difficile* infections, a deadly gut infection that may more easily infect those who recently underwent aggressive antibiotic treatment.

Pregnant Women, Children and the Elderly Carry a Higher Risk

Diarrhea and dehydration carry a higher risk potential for pregnant women, children and the elderly, no matter how healthy they may be. This means that if you fall in one of these groups, you may experience a lengthier illness than a healthy adult.²⁰ Young children have a higher percentage of water body weight and have smaller bodies, making the percent of weight loss more dangerous. They also have developing immune systems, making it more difficult to fight the initial infection.

During pregnancy, a woman's **immune system** is altered making it more difficult for her body to fight an infection. Bacteria may also cross the placental barrier and harm the

child. Fluid loss resulting from diarrhea may both harm the mother and place the baby at higher risk of death. As you age, body water composition changes as does your thirst drive.²¹ Combined with a reduction in renal function, the elderly are at greater risk of dehydration from any cause.

Cleanliness, Antibiotics and Sugar May Contribute to Poor Gut Health

Researchers from the Global Disease Burden attribute the growing number of people suffering from diarrheal illnesses to an increased use of antibiotics.²² One study demonstrated that just a one weeklong course of antibiotics could change the colonies in your gut microbiome for up to one year.²³

The researchers gave participants a one-week course of antibiotics from one of four different drugs. They tested salivary and fecal bacteria before treatment, at one week and one, two, four and 12 months after treatment.

The effects varied based on the antibiotic used, but more commonly the oral bacteria rebounded more quickly and gut microbiome bacteria suffered drastically.²⁴ Foods high in sugar may also contribute to diarrhea. Sugar may trigger dumping syndrome, or the rapid movement of food through your intestinal tract.²⁵ Sugar is also the nutrient of choice for many of the bacteria that trigger diarrhea, such as E. coli.²⁶

Sugar increases the growth of bacteria normally living in your gut that are not beneficial. Researchers compared the gut flora of children who ate higher amounts of sugar to those who don't and found those who ate less sugar had more diverse colonies of bacteria and were better able to regulate their immune system and suppress infection.²⁷ Sugar helps bad bacteria in your gut to multiply rapidly and reduce your protection against disease.

Artificial sweeteners contain sugar alcohols that contain less calories than sugar, but have a negative effect on the development of glucose intolerance and also have a laxative effect on your gastrointestinal tract.²⁸

Using products that reduce your exposure to bacteria may also reduce the diversity of the bacteria in your gut, and the products used to kill the bacteria often cause more trouble. Triclosan and triclocarban, common in antibacterial soaps and hand washes, may actually increase the risk of getting sick and come with their own set of risks.

Recharge Your Gut With Probiotics

You may be able to improve the diversity and strength of the good bacteria in your gut by eating foods grown in healthy soil. The optimization of soil microbiology increases the number of good bacteria to which you are exposed in the plants you eat. This is a strong reason to not eat genetically engineered organisms that are genetically programmed to withstand heavy doses of herbicide, which also destroys the soil biome.²⁹

One of the best and least expensive ways of optimizing your gut microbiome is to eat a healthy diet rich in organically grown, plant-based foods, high in whole foods, while eliminating processed foods and those high in sugar.

The addition of traditionally fermented foods increases your exposure to beneficial bacteria. You may also find probiotic supplements helpful. These supplements are designed to increase your levels of beneficial bacteria, but it is also important to optimize the conditions in which these bacteria grow.

A new class of **probiotic supplements** are made from soil-based organisms (SBO), which have a unique ability to "seed" the gut as they are naturally resistant to the harsh environment of the stomach and upper intestines, ultimately landing where they belong.³⁰ These probiotics don't require additional coating or preservatives to reach the proper area of the gut. This is due to the natural shell that surrounds these organisms that protects them from harm.

This means they have a simple and natural advantage over bacteria found in yogurts and other advertised processed probiotic foods that may not live through the acidic environment of your stomach and upper intestinal tract. There are other strategies you

may use to reduce the damage to your beneficial bacteria and help them to grow and multiply. You may read more about these strategies in my previous articles:

- [Nourishing Gut Bacteria Is Critical for Health, Well-Being](#)
- [Go With Your Gut](#)

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