

You have likely experienced nausea, vomiting, and diarrhea. Was it something you ate, or did you pick up some sort of bug? Whatever the cause, it was likely a very unpleasant experience! Although unpleasant, vomiting and diarrhea serve a useful function. They are two of the many strategies that the body uses to protect itself from disease-causing agents and foreign substances.

Nausea and Vomiting

The condition referred to as **nausea** is the unpleasant feeling that you are about to vomit. Your mouth may start to water and your stomach feel upset. You may break into a cold sweat and look rather pale. These feelings often, but not always, precede vomiting.

Vomiting is a protective mechanism for removing toxins or foreign substances from the body. Vomiting, or **emesis**, is a strong muscular contraction that forces the contents of the stomach up through the esophagus and out through the mouth (and sometimes the nose). The prolonged, strong contractions of the diaphragm and tightening of the abdominal muscles force the stomach contents upward (**Figure 1**). At the same time, the gastroesophageal sphincter relaxes, allowing the contents of the stomach, now referred to as vomitus, to be expelled. During vomiting, breathing ceases as the larynx and epiglottis close the entrance to the trachea to prevent air or vomitus from entering the lungs.

nausea the feelings associated with having the urge to vomit

emesis the expulsion of stomach contents through the esophagus and the mouth; also known as vomiting

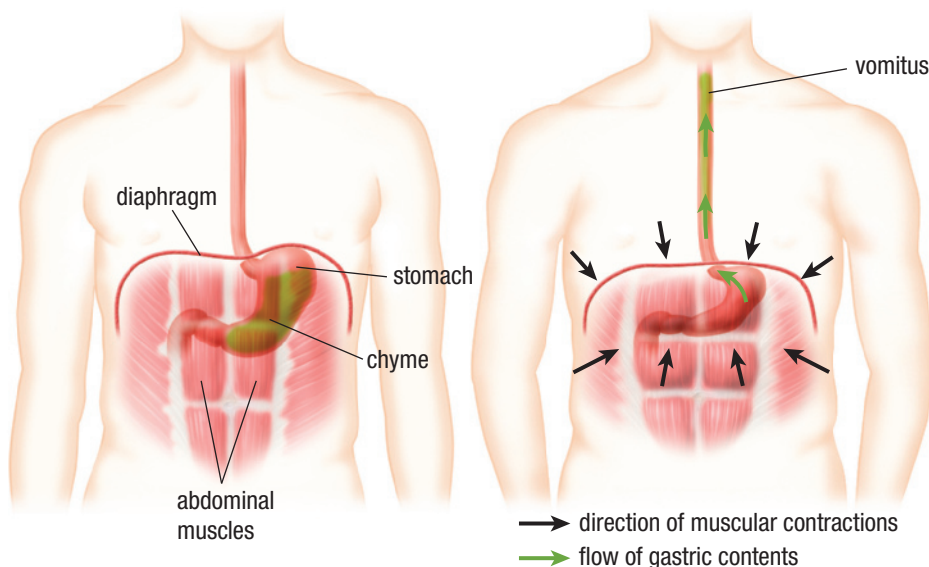


Figure 1 A strong contraction of the diaphragm and the abdominal muscles squeezes the stomach and forces its contents up through the esophagus and out of the body.

Causes of Vomiting

Nausea and vomiting are not disorders or diseases themselves; they are symptoms of some underlying condition. The signal for vomiting comes from the vomiting centre in the brain. This network of nerve cells receives stimuli from various parts of the body, such as the stomach, intestines, bloodstream, inner ear, or sensory organs. The stimuli may trigger the vomiting centre to initiate vomiting.

There are numerous conditions and diseases that can lead to nausea and vomiting (**Table 1**). The act of vomiting is the same regardless of the cause. Remember that vomiting is a symptom, not a disease itself. It is important to attempt to identify the underlying cause and treat the cause rather than the symptom.

Table 1 Causes of Nausea and Vomiting

Category of conditions	Examples
inner ear	<ul style="list-style-type: none"> • motion sickness • Ménière's disease
drugs	<ul style="list-style-type: none"> • chemotherapy • alcohol
infections	<ul style="list-style-type: none"> • bacterial, such as food or water poisoning • viral, such as stomach flu
brain	<ul style="list-style-type: none"> • meningitis • tumours
injury	<ul style="list-style-type: none"> • concussion • hemorrhage
diseases	<ul style="list-style-type: none"> • cancer • ulcers

Risks Associated with Vomiting

The main concern with vomiting is dehydration. If vomiting persists for more than a day and fluids cannot be held in the stomach, there is a risk of severe dehydration, and medical intervention may be required.

Another risk of vomiting is that some of the vomitus may enter the respiratory tract. The coughing reflex normally eliminates any material that enters the trachea, but if this reflex is impaired, by excessive alcohol consumption, for example, or if the vomitus is not completely cleared out of the trachea, then the individual may asphyxiate or develop an infection in the lungs because of the foreign matter.

Due to the forceful muscle contractions involved in vomiting, prolonged vomiting can result in tears in the lining of the esophagus or, less seriously, strains of the abdominal muscles.

Diarrhea

Most of the water in the food we eat and in the liquids we drink is absorbed in the colon. Water absorption forms the feces into a soft solid mass. If, for a variety of reasons, there is inadequate absorption, the feces are egested in a loose or watery form, which is a condition known as **diarrhea**. This is a very common condition, and the average person experiences diarrhea three or four times a year. Diarrhea is usually accompanied by other symptoms, such as an upset stomach, stomach pains, cramps, and intestinal gas.

diarrhea loose or watery feces

Causes and Risks of Diarrhea

Like vomiting, diarrhea is a protective mechanism. It is a way of flushing an infecting agent or foreign substance from the body. Some of the causes of vomiting are also commonly associated with diarrhea, but most cases of diarrhea are caused by some sort of infection. Common infecting agents include bacteria, viruses, and parasites. In many cases, bacteria, such as *Salmonella*, *Campylobacter*, or *E. coli*, enter the GI tract through contaminated food or water.

An *E. coli* infection is a very serious illness, especially for young children, the elderly, and individuals with existing health complications. Infections can trigger diarrhea, internal bleeding, and dehydration. In severe cases, it can result in kidney failure, which can be fatal if not properly treated. Other than ensuring that the infected person is properly hydrated and has proper nutrition, there is no specific treatment for *E. coli* infections. The infection usually runs its course in two to three weeks.

A highly publicized outbreak of *E. coli* infections occurred in Walkerton, Ontario, in May 2000. Walkerton's water supply became contaminated with an unusually virulent, or dangerous, strain of *E. coli* known as O157:H7, most commonly found in the gut of cows (**Figure 2**). Contaminated runoff from a nearby farm introduced the bacteria into the water supply. There were 1346 confirmed cases of *E. coli* infection, but it is estimated that more than 2000 individuals were infected. At least seven deaths were directly attributed to the infections.

Another similar food-borne illness caused by a bacterium is listeriosis. It is caused by the bacterium *Listeria monocytogenes*. These bacteria can be found in human and other animal feces, plants, and soil and can contaminate food products during food production, processing, or preparation. As in other food-borne illnesses, diarrhea is a common symptom. Although listeriosis is rarer than other diseases, it is more serious because severe cases are more likely to be fatal.

It is difficult to determine the number of cases of food-borne illnesses, because not all cases require hospitalization or a visit to a doctor. However, public health officials estimate that there are between 11 million and 13 million cases of food-borne illness in Canada annually. Food-borne illnesses can be greatly reduced by proper hygiene and proper storage and cooking of meat, poultry, and seafood (**Figure 3**). It should be noted that both vomiting and diarrhea increase the likelihood that these disease-causing organisms will spread from one individual to another.



Figure 2 *E. coli* are found in the intestines of cows and other animals.



Figure 3 Undercooked meat, especially ground beef, is a common cause of bacterial infections causing diarrhea.

Research This

Diarrhea as a Cause of Death

Skills: Researching, Evaluating, Communicating







SKILLS
HANDBOOK  A2.1, A5.1

Despite the fact that most cases of diarrhea are easily and successfully treated, diarrhea kills about two million children worldwide each year—more than AIDS, malaria, and measles combined. It is second only to respiratory infections (mainly pneumonia) as the leading cause of death of children under five years of age.

1. Use the Internet and other sources to research the following:

- the status of diarrhea-related illnesses in different regions of the world
- the major causes of diarrhea
- the recommended treatments and prevention

2. Summarize your findings in a one-page report.

- A. In what regions of the world is diarrhea a significant problem? In which regions do most child deaths due to diarrhea occur? Provide statistics to support your answer. 
- B. Why is diarrhea a significant cause of death in developing countries, more so than in developed countries?  
- C. The main treatment for diarrhea seems easy and very inexpensive. What factors do you think contribute to the lack of progress in preventing deaths from diarrhea?  
- D. Do you think of diarrhea as a cause of death in your community? Explain your thinking. 






















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9.6 Summary

- Nausea is the feeling associated with the urge to vomit.
- One of the body's safety mechanisms for eliminating toxic or foreign substances is vomiting, or emesis, which is the emptying of the stomach contents through the mouth.
- Incomplete absorption of water in the colon results in watery feces, a condition known as diarrhea. Most cases of diarrhea are caused by infection.
- Both vomiting and diarrhea can result in health risks such as dehydration and other complications.

9.6 Questions

1. Using examples, explain the protective role of vomiting and diarrhea.  
2. Describe the circumstances and the feelings during your last experience of nausea or vomiting.  
3. Explain what takes place in the body during emesis, or vomiting. 
4. Pick one of the conditions in Table 1 (page 421) that could lead to vomiting. Use the Internet and other sources to research this condition. Prepare a brief report on the condition. Based on the information, assess the likelihood that vomiting will be one of the symptoms of the condition.   
5. What is diarrhea? Name a common cause and describe how it is treated. 
6. (a) What is the greatest risk associated with vomiting and diarrhea?
- (b) Use the Internet and other sources to find out the symptoms and risks associated with dehydration.    
7. Use the Internet and other sources to research *E. coli* infection. Based on your research, prepare a list of precautions that can be taken to help prevent *E. coli* infection.   
8. Licensed food establishments are required to meet certain standards of hygiene in order to maintain their licence. Use the Internet and other sources to research the provincial regulations. Write a brief report summarizing the requirements for obtaining and renewing a food service licence.   



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