

H. pylori and Peptic Ulcers

National Digestive Diseases Information Clearinghouse



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What is a peptic ulcer?

A peptic ulcer is a sore on the lining of the stomach or duodenum, the beginning of the small intestine. Less commonly, a peptic ulcer may develop just above the stomach in the esophagus, the tube that connects the mouth to the stomach.

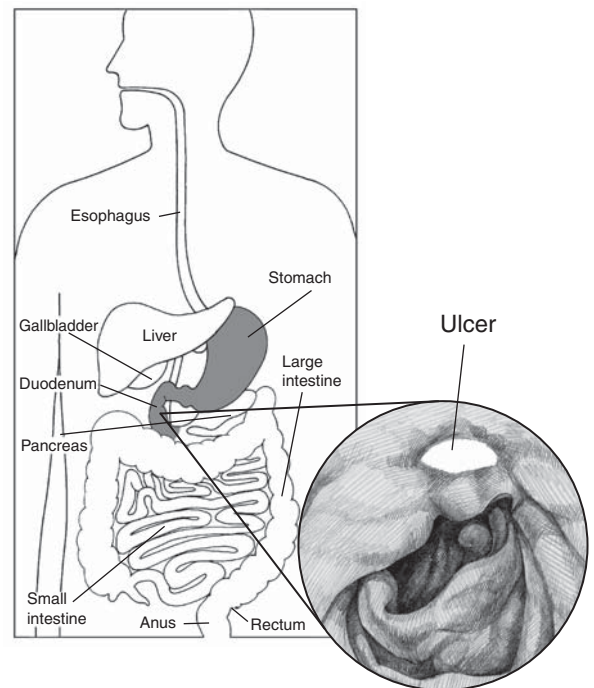
A peptic ulcer in the stomach is called a gastric ulcer. One that occurs in the duodenum is called a duodenal ulcer. People can have both gastric and duodenal ulcers at the same time. They also can develop peptic ulcers more than once in their lifetime.

Peptic ulcers are common. Each year in the United States, about half a million people develop a peptic ulcer.¹

What causes peptic ulcers?

A bacterium called *Helicobacter pylori* (*H. pylori*) is a major cause of peptic ulcers. Nonsteroidal anti-inflammatory drugs (NSAIDs), such as aspirin and ibuprofen, are another common cause. Rarely, cancerous or noncancerous tumors in the stomach, duodenum, or pancreas cause ulcers.

Peptic ulcers are not caused by stress or eating spicy food, but both can make ulcer symptoms worse. Smoking and drinking alcohol also can worsen ulcers and prevent healing.



H. pylori bacteria can cause peptic ulcers—sores on the lining of the stomach or duodenum.

What is *H. pylori*?

H. pylori is a type of bacteria—a germ that may cause infection. *H. pylori* infection is common, particularly in developing countries, and often begins in childhood. Symptoms usually don't occur until adulthood, although most people never have any symptoms.

¹Ramakrishnan K, Salinas RC. Peptic ulcer disease. *American Family Physician*. 2007;76(7):1005–1012.

H. pylori causes more than half of peptic ulcers worldwide.² The bacterium causes peptic ulcers by damaging the mucous coating that protects the stomach and duodenum. Damage to the mucous coating allows powerful stomach acid to get through to the sensitive lining beneath. Together, the stomach acid and *H. pylori* irritate the lining of the stomach or duodenum and cause an ulcer.

Yet, most people infected with *H. pylori* never develop ulcers. Why the bacterium causes ulcers in some people and not in others is not known. Most likely, development of ulcers depends on characteristics of the infected person; the type, or strain, of *H. pylori* present; and factors researchers have yet to discover.

How is *H. pylori* spread?

Researchers are not certain how *H. pylori* is transmitted, although they think it may be spread through contaminated food or water. People may pick up the bacterium from food that has not been washed well or cooked properly or from drinking water that has come from an unclean source.

Other research is exploring how infection spreads from an infected person to an uninfected person. Studies suggest that having contact with the stool or vomit of an infected person can spread *H. pylori* infection. And *H. pylori* has been found in the saliva of some infected people, which means infection could be spread through direct contact with saliva.

²*Helicobacter pylori* and peptic ulcer disease; economics of peptic ulcer disease and *H. pylori* infection. Centers for Disease Control and Prevention website. www.cdc.gov/ulcer/economic.htm. Accessed February 23, 2009.

What are the symptoms of a peptic ulcer?

Abdominal discomfort is the most common symptom of both duodenal and gastric ulcers. Felt anywhere between the navel and the breastbone, this discomfort usually

- is a dull or burning pain
- occurs when the stomach is empty—between meals or during the night
- may be briefly relieved by eating food, in the case of duodenal ulcers, or by taking antacids, in both types of peptic ulcers
- lasts for minutes to hours
- comes and goes for several days or weeks

Other symptoms of a peptic ulcer may include

- weight loss
- poor appetite
- bloating
- burping
- nausea
- vomiting

Some people experience only mild symptoms or none at all.

Emergency Symptoms

A person who has any of the following symptoms should call a doctor right away:

- sharp, sudden, persistent, and severe stomach pain
- bloody or black stools
- bloody vomit or vomit that looks like coffee grounds

These “alarm” symptoms could be signs of a serious problem, such as

- bleeding—when acid or the peptic ulcer breaks a blood vessel
- perforation—when the peptic ulcer burrows completely through the stomach or duodenal wall
- obstruction—when the peptic ulcer blocks the path of food trying to leave the stomach

How is an *H. pylori*-induced ulcer diagnosed?

Noninvasive Techniques

If a patient has peptic ulcer symptoms, the doctor first asks about use of over-the-counter and prescription NSAIDs. Patients who are taking an NSAID are asked to stop, reduce the dose, or switch to another medication.

Then the doctor tests to see if *H. pylori* is present. Testing is important because *H. pylori*-induced ulcers are treated differently than ulcers caused by NSAIDs.

Doctors use one of three simple, noninvasive tests to detect *H. pylori* in a patient’s blood, breath, or stool. Because the breath test and stool test more accurately detect *H. pylori* than the blood test, some doctors prefer to use one of these two tests. Each test described below is easily performed, often in an outpatient setting such as a doctor’s office or lab.

Blood test. A blood sample is taken from the patient’s vein and tested for *H. pylori* antibodies. Antibodies are substances the body produces to fight invading harmful substances—called antigens—such as the *H. pylori* bacterium.

Urea breath test. The patient swallows a capsule, liquid, or pudding that contains urea “labeled” with a special carbon atom. After a few minutes, the patient breathes into a container, exhaling carbon dioxide. If the carbon atom is found in the exhaled breath, *H. pylori* is present, as this bacterium contains large amounts of urease, a chemical that breaks urea down into carbon dioxide and ammonia.

Stool antigen test. The patient provides a stool sample, which is tested for *H. pylori* antigens.

Invasive Techniques

If a patient has any alarm symptoms, the doctor orders an endoscopy or upper gastrointestinal (GI) series. Many doctors also recommend these tests for patients who first experience peptic ulcer symptoms around age 50. Often performed as outpatient procedures in a hospital, both procedures are painless and allow the doctor to look inside the patient’s stomach and duodenum.

For an endoscopy, the patient is lightly sedated. The doctor passes an endoscope—a thin, lighted tube with a tiny camera on the end—into the patient’s mouth and down the throat to the stomach and duodenum. With this tool, the doctor can closely examine the lining of the esophagus, stomach, and duodenum.

The doctor can use the endoscope to take photos of ulcers or remove a tiny piece of tissue—no bigger than a match head—to view with a microscope. This procedure is called a biopsy. The biopsied tissue is examined to see if *H. pylori* is present.

If an ulcer is bleeding, the doctor can use the endoscope to inject medicines that help the blood clot or to guide a heat probe that burns tissue to stop bleeding—a process called cauterization.

For an upper GI series, the patient drinks a white, chalky liquid called barium. The barium makes the esophagus, stomach, and duodenum and any ulcers show up on an x ray. Sedation is not necessary for this procedure.

How is an *H. pylori*-induced ulcer treated?

Peptic ulcers caused by *H. pylori* are treated with drugs that kill the bacteria, reduce stomach acid, and protect the stomach and duodenal lining.

Antibiotics are used to kill *H. pylori*. Antibiotic regimens may differ throughout the world because some strains of *H. pylori* have become resistant to certain antibiotics—meaning that an antibiotic that once destroyed the bacterium is no longer effective. Doctors closely follow research on antibiotic treatments for *H. pylori* infection to know which treatment strategy will destroy which strain.

Medicines that reduce stomach acid include proton pump inhibitors (PPIs) and histamine receptor blockers (H2 blockers). Both acid-reducing medicines help relieve peptic ulcer pain after a few weeks and promote ulcer healing. PPIs and H2 blockers work in different ways:

- PPIs suppress acid production by halting the mechanism that pumps acid into the stomach.
- H2 blockers work by blocking histamine, which stimulates acid secretion.

While PPIs cannot kill *H. pylori*, research shows they do help fight the *H. pylori* infection. Research also shows that after 4 weeks of treatment, patients taking PPIs had earlier pain relief and better healing rates than those taking H2 blockers.

Bismuth subsalicylate (Pepto-Bismol) coats ulcers, protecting them from stomach acid. Although bismuth subsalicylate may kill *H. pylori*, it is used with—not in place of—antibiotics in some treatment regimens.

In the United States, clarithromycin-based triple therapy—triple therapy, for short—is the standard treatment for an ulcer caused by *H. pylori*. The doctor prescribes the antibiotic clarithromycin, a PPI, and the antibiotics amoxicillin or metronidazole for 10 to 14 days. Because research shows higher cure rates with 14 days of treatment, some doctors now prescribe triple therapy for this longer period.

Bismuth quadruple therapy is another treatment strategy used in the United States. The patient takes a PPI, bismuth subsalicylate, and the antibiotics tetracycline and metronidazole for 10 to 14 days. Bismuth quadruple therapy is used to treat patients in one of several situations, including if the patient

- cannot take amoxicillin—a penicillin-like antibiotic—because of a penicillin allergy
- has been treated before with a macrolide antibiotic, such as clarithromycin
- is still infected with *H. pylori* because triple therapy failed to kill the bacteria

Triple therapy and bismuth quadruple therapy may cause nausea and other side effects, including

- stomach upset
- diarrhea
- headache
- a metallic taste
- a darkened tongue or stools
- flushing when drinking alcohol
- sensitivity to the sun

Patients should discuss any bothersome side effects with their doctor, who may prescribe other medicines to kill the bacteria and cure the ulcer.

Although antibiotics can cure 80 to 90 percent of ulcers caused by *H. pylori*, eliminating the bacteria can be difficult. Patients must take all medicines exactly as prescribed, even when the peptic ulcer pain is gone.

At least 4 weeks after treatment, doctors test patients using a breath or stool test to be sure the *H. pylori* infection has been cured. Blood tests are not useful after treatment because a patient's blood can test positive for *H. pylori* even after the bacteria have been eliminated.

If infection is still present, ulcers could recur or, less commonly, stomach cancer could develop. Thus, some patients need to take more than one round of medicines to kill the *H. pylori* bacteria. Bismuth quadruple therapy is one of several treatments used after initial treatment has failed—a strategy called “rescue” or “salvage” therapy. In the second round of treatment, the doctor

prescribes different antibiotics than those used in the first round. Amoxicillin, however, can be used again to treat *H. pylori* infection because *H. pylori* resistance to this antibiotic is rare.

Can antacids or milk help a peptic ulcer heal?

An antacid may make the ulcer pain go away temporarily, but it will not kill *H. pylori*. People being treated for an *H. pylori* ulcer should check with their doctor before taking antacids. Some of the antibiotics used to kill *H. pylori* may not work as well if combined with an antacid.

People used to believe drinking milk helped peptic ulcers heal. But doctors know now that while milk may make an ulcer feel better briefly, it also increases stomach acid, which can make ulcers worse. Patients should talk with their doctor about drinking milk while an ulcer is healing.

Can *H. pylori* infection be prevented?

No one knows for sure how *H. pylori* spreads, so prevention is difficult. Researchers are trying to develop a vaccine to prevent—and even cure—*H. pylori* infection. To help prevent infection, doctors advise people to

- wash their hands with soap and water after using the bathroom and before eating
- eat food that has been washed well and cooked properly
- drink water from a clean, safe source

Points to Remember

- A peptic ulcer is a sore in the lining of the stomach or duodenum.
- Most peptic ulcers are caused by *H. pylori*. Use of NSAIDs—such as aspirin and ibuprofen—is another common cause.
- Neither stress nor spicy food causes ulcers. Smoking or drinking alcohol, however, each can worsen ulcers and prevent their healing.
- The abdominal discomfort of peptic ulcers
 - feels like a dull or burning pain
 - occurs when the stomach is empty—between meals or during the night
 - may be briefly relieved by eating food, in the case of duodenal ulcers, or by taking antacids, in both types of peptic ulcers
 - lasts for minutes to hours
 - comes and goes for several days or weeks
- A combination of antibiotics and acid-reducing medicines is the most effective treatment for *H. pylori*-induced peptic ulcers.
- Testing after treatment is needed to be sure the *H. pylori* infection is gone.
- To help prevent an *H. pylori* infection, people should
 - wash their hands after using the bathroom and before eating
 - eat properly prepared food
 - drink water from a clean, safe source

Hope through Research

While *H. pylori* infection is becoming less common in developed countries, some strains of the bacteria have become resistant to antibiotics that are used to destroy it. Researchers have identified and continue to study new antibiotic combinations that can kill these types of *H. pylori*.

Other promising research may help identify treatments that

- kill the *H. pylori* bacteria with fewer medicines in less time
- use different antibiotic combinations in back-to-back treatment
- better protect the stomach lining when eliminating *H. pylori*

Researchers also are studying

- characteristics of *H. pylori* bacteria
- traits of people who develop *H. pylori* ulcers
- transmission of *H. pylori* infection
- vaccines to prevent and cure *H. pylori* infection

Participants in clinical trials can play a more active role in their own health care, gain access to new research treatments before they are widely available, and help others by contributing to medical research. For information about current studies, visit www.ClinicalTrials.gov.

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