

# Gastroesophageal Reflux (GER) and Gastroesophageal Reflux Disease (GERD) in Children and Adolescents

*National Digestive Diseases Information Clearinghouse*



National Institute of  
Diabetes and Digestive  
and Kidney Diseases

## What is GER?

Gastroesophageal reflux (GER) occurs when stomach contents flow back up into the esophagus—the muscular tube that carries food and liquids from the mouth to the stomach.

GER is also called acid reflux or acid regurgitation because the stomach’s digestive juices contain acid. Sometimes people with GER can taste food or acidic fluid in the back of the mouth. Refluxed stomach acid that touches the lining of the esophagus can cause heartburn. Also called acid indigestion, heartburn is an uncomfortable, burning feeling in the midchest, behind the breastbone, or in the upper part of the abdomen—the area between the chest and the hips.

Occasional GER commonly occurs in children and adolescents—ages 2 to 19—and does not always mean they have GERD. Children and adolescents may be able to control GER by

- avoiding foods and beverages that contribute to heartburn, such as chocolate, coffee, peppermint, greasy or spicy foods, tomato products, and alcoholic beverages
- avoiding overeating

- quitting smoking
- losing weight if they are overweight
- not eating 2 to 3 hours before sleep
- taking over-the-counter medications

Read more about over-the-counter medications in the section “How is GERD treated in children and adolescents?”

## What is GERD?

Gastroesophageal reflux disease (GERD) is a more serious, chronic—or long lasting—form of GER. GER that occurs more than twice a week for a few weeks could be GERD, which over time can lead to more serious health problems. If caregivers suspect their child or adolescent has GERD, they should take their child or adolescent to see a pediatrician—a doctor who specializes in treating children and adolescents.

## What causes GERD in children and adolescents?

Gastroesophageal reflux disease results when the lower esophageal sphincter—the muscle that acts as a valve between the esophagus and stomach—becomes weak or relaxes when it should not, causing stomach contents to rise up into the esophagus.

Other factors that can contribute to GERD include

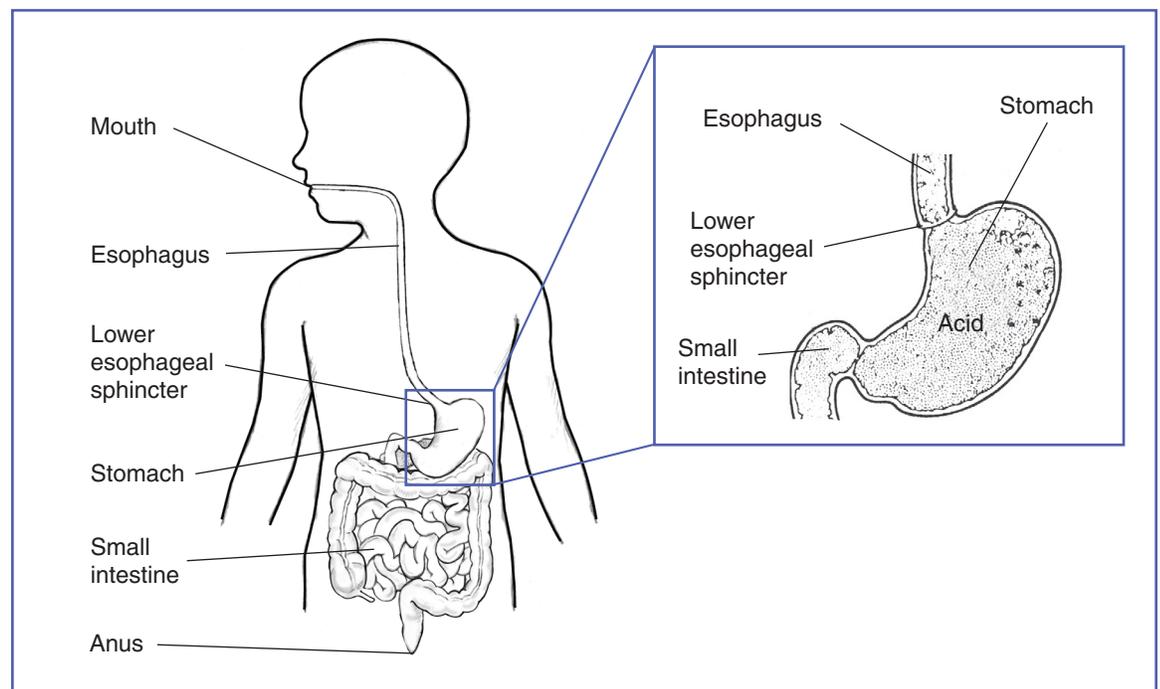
- obesity
- certain medications, such as asthma medications and many antihistamines, pain killers, sedatives, and antidepressants
- smoking, which is more likely with adolescents than younger children, or inhaling secondhand smoke

Children who have a history of esophageal surgery and children with severe developmental delays are more likely to develop GERD. Pregnant adolescent girls

may also develop GERD symptoms. Any child or adolescent can develop GERD, some for unknown reasons.

## What is the gastrointestinal (GI) tract?

The GI tract is a series of hollow organs joined in a long, twisting tube from the mouth to the anus. The movement of muscles in the GI tract, along with the release of hormones and enzymes, starts the digestion of food. The upper GI tract includes the mouth, esophagus, stomach, small intestine, and duodenum, which is the first part of the small intestine.



GERD results when the lower esophageal sphincter—the muscle that acts as a valve between the esophagus and stomach—becomes weak or relaxes when it should not, causing stomach contents to rise up into the esophagus.

## What are the symptoms of GERD in children and adolescents?

In older children and adolescents, the main symptom of GERD is frequent heartburn. Most children with GERD who are younger than 12 do not have heartburn. Other common GERD symptoms include

- a dry, chronic cough
- wheezing
- asthma or recurrent pneumonia
- nausea
- vomiting
- a sore throat, hoarseness, or laryngitis—swelling and irritation of the voice box
- difficulty swallowing or painful swallowing
- pain in the chest or the upper part of the abdomen
- dental erosion and bad breath

Caregivers should call a pediatrician right away if their child or adolescent

- vomits large amounts or has persistent projectile, or forceful, vomiting
- vomits fluid that is green or yellow, looks like coffee grounds, or contains blood

- has difficulty breathing after vomiting
- has pain related to eating
- has difficulty swallowing or painful swallowing
- refuses food repeatedly, resulting in weight loss or poor weight gain
- shows signs of dehydration, such as no tears when crying

## How is GERD diagnosed in children and adolescents?

A pediatrician may refer children and adolescents with suspected GERD to a pediatric gastroenterologist—a doctor who specializes in childhood and adolescent digestive diseases—for diagnosis and treatment.

Lifestyle changes and medications are often the first lines of treatment for suspected GERD. If symptoms improve with these treatment methods, a GERD diagnosis for a child or an adolescent often does not require testing. However, to confirm a diagnosis, a child or an adolescent may need testing if symptoms do not improve. Children and adolescents with possible GERD who have trouble swallowing also may require testing.

A completely accurate test for diagnosing GERD does not exist. However, several tests can help with diagnosis:

**Upper GI series.** While a pediatric gastroenterologist does not use an upper GI series to diagnose acid reflux or GERD, the test can provide a look at the shape of the upper GI tract. An x-ray technician performs this test at a hospital or an outpatient center, and a radiologist—a doctor who specializes in medical imaging—interprets the images. This test does not require anesthesia. If possible, a child or an adolescent should not eat or drink before the procedure, as directed by the health care staff. Caretakers should check with the child’s or adolescent’s pediatric gastroenterologist about what to do to prepare for an upper GI series.

During the procedure, the child or adolescent will stand or sit in front of an x-ray machine and drink barium, a chalky liquid. Barium coats the esophagus, stomach, and small intestine, so the radiologist and pediatric gastroenterologist can see these organs’ shapes more clearly on x rays. A pediatric gastroenterologist cannot use this test to detect mild irritation; however, this test can detect esophageal strictures—narrowing of the esophagus that can result from GERD.

Children and adolescents may experience bloating and nausea for a short time after the test. For several days afterward, barium liquid in the GI tract causes white or light-colored stools. A health care provider will provide specific instructions about eating and drinking after the test.

**Upper endoscopy.** A pediatric gastroenterologist may use an upper endoscopy, also known as an esophagogastroduodenoscopy, if a child or an adolescent continues to have GERD symptoms despite lifestyle changes and treatment with medications. An upper endoscopy is a common test used to evaluate the severity of GERD. This procedure involves using an endoscope—a small, flexible tube with a light—to see the upper GI tract.

A pediatric gastroenterologist performs this test at a hospital or an outpatient center. Children and adolescents may receive a liquid anesthetic that is gargled or sprayed on the back of the throat. If sedation is used, a health care provider will place an intravenous (IV) needle in the child’s or adolescent’s vein.

After the child or adolescent receives sedation, the pediatric gastroenterologist carefully feeds an endoscope through the mouth and down the esophagus, then into the stomach and duodenum. A small camera mounted on the endoscope transmits a video image to a monitor, allowing close examination of the intestinal lining. The pediatric gastroenterologist uses the endoscope to take a biopsy, a procedure that involves taking a small piece of esophageal tissue. A pathologist—a doctor who specializes in diagnosing diseases—will examine the tissue with a microscope and determine the extent of inflammation.

A pediatric gastroenterologist diagnoses GERD when the test shows injury to the esophagus in children or adolescents who have had moderate to severe GERD symptoms.

**Esophageal pH monitoring.** The most accurate test to detect acid reflux, esophageal pH monitoring measures the amount of liquid or acid in the esophagus as the child or adolescent goes about normal activities, including eating and sleeping. A pediatric gastroenterologist performs this test at a hospital or an outpatient center as a part of an upper endoscopy. The child or adolescent can remain awake during the test.

A pediatric gastroenterologist passes a thin tube, called a nasogastric probe, through the child's or adolescent's nose or mouth to the stomach. The pediatric gastroenterologist will then pull the tube back into the

esophagus, where it will be taped to the child's or adolescent's cheek and remain in place for 24 hours. The end of the tube in the esophagus has a small probe to measure when and how much liquid or acid comes up into the esophagus. The other end of the tube, attached to a monitor outside the body, shows the measurements taken.

This test is most useful when combined with a carefully kept diary of when, what, and how much food the child or adolescent eats and GERD symptoms that result. The pediatric gastroenterologist can see correlations between symptoms and certain foods or times of day. The procedure can also help show whether reflux triggers respiratory symptoms.

## How is GERD treated in children and adolescents?

Treatment for GERD for children and adolescents may involve one or more of the following, depending on the severity of symptoms: lifestyle changes, medications, or surgery.

### Lifestyle Changes

Some children and adolescents can reduce GERD symptoms by

- losing weight, if needed
- wearing loose-fitting clothes around the stomach area, as tight clothing can constrict the area and increase reflux

- remaining upright for 3 hours after meals
- raising the head of the bed 6 to 8 inches by securing wood blocks under the bedposts—just using extra pillows will not help
- avoiding smoking and being around others who are smoking

## Medications

Caregivers can purchase many GERD medications without a prescription. However, caregivers should not give children and adolescents any medications unless told to do so by their child's or adolescent's pediatrician.

**Antacids**, which include over-the-counter medications such as Alka-Seltzer, Maalox, Mylanta, Roloids, and Riopan, are a first-line approach most health care providers usually recommend to relieve heartburn and other mild GERD symptoms. Antacids, however, can have side effects, including diarrhea and constipation.

**H2 blockers**, such as cimetidine (Tagamet HB), famotidine (Pepcid AC), nizatidine (Axid AR), and ranitidine (Zantac 75), decrease acid production. These medications are available in both over-the-counter and prescription strengths. H2 blockers provide short-term or on-demand relief and are effective for many children and adolescents

with GERD symptoms. They also can help heal the esophagus, although not as well as proton pump inhibitors (PPIs).

**PPIs** include omeprazole (Prilosec, Zegerid), lansoprazole (Prevacid), pantoprazole (Protonix), rabeprazole (Aciphex), and esomeprazole (Nexium), which are available by prescription. Omeprazole and lansoprazole also come in over-the-counter strengths. PPIs are more effective than H2 blockers and can relieve symptoms and heal the esophageal lining in most children and adolescents with GERD. Health care providers most commonly prescribe PPIs for long-term management of GERD. However, studies show they are more likely to cause hip, wrist, and spinal fractures when taken long term or in high doses. Children and adolescents should take these medications on an empty stomach in order for stomach acid to activate them.

**Prokinetics**, which include bethanechol (Urecholine) and metoclopramide (Reglan), help make the stomach empty faster. However, both bethanechol and metoclopramide have side effects that often limit their use, including nausea, diarrhea, tiredness, depression, anxiety, and problems with physical movement. Prokinetics can interact with other medications, so caregivers should tell the health care provider about all medications the child or adolescent takes.

**Antibiotics**, including one called erythromycin, have been shown to improve gastric emptying. Erythromycin has fewer side effects than bethanechol and metoclopramide; however, like all antibiotics, it can cause diarrhea.

All of these medications work in different ways, so combinations of medications may help control symptoms. Older children who get heartburn after eating may take antacids and H2 blockers. The antacids neutralize stomach acid, and the H2 blockers stop acid production. By the time the antacids stop working, the H2 blockers have stopped acid production. Health care providers can advise caregivers about how their children or adolescents should use GERD medications.

## **Surgery**

When children and adolescents cannot manage severe GERD symptoms through medication or lifestyle changes, a health care provider may recommend surgery. A health care provider may also recommend surgery for GERD that results from a physical abnormality or GERD symptoms that lead to severe respiratory problems. Fundoplication is the standard surgical treatment for GERD and leads to long-term reflux control in most

cases. A pediatric gastroenterologist or surgeon may also use endoscopic techniques to treat GERD. However, the success rates of endoscopic techniques are not completely known, as researchers have not tested them enough in clinical trials. Adolescents and children are more likely to develop complications from surgery than from medications; however, anti-reflux surgery is more successful in children and adolescents than in adults.

**Fundoplication** is an operation to sew the top of the stomach around the esophagus to add pressure to the lower end of the esophagus and reduce reflux. A pediatric surgeon performs fundoplication using a laparoscope, a thin tube with a tiny video camera attached used to look inside the body. When performed by an experienced pediatric surgeon, fundoplication is safe and effective in children and adolescents of all ages. The surgeon performs the operation at a hospital or an outpatient center, and the child or adolescent receives general anesthesia. Children and adolescents can leave the hospital or outpatient center in 1 to 3 days and return to school and daily activities in 2 to 3 weeks.

**Endoscopic techniques**, such as endoscopic sewing and radiofrequency, help control GERD in a small number of children and adolescents. Endoscopic sewing uses small stitches to tighten the sphincter muscle. Radiofrequency creates heat lesions that help tighten the sphincter muscle. Surgery for both techniques requires an endoscope. A pediatric surgeon performs the surgery at a hospital or an outpatient center, and the child or adolescent receives anesthesia. Although the devices for these procedures are approved, results may not be as good as laparoscopic surgery, and these procedures are not commonly used.

## What are the long-term complications of GERD for children and adolescents?

Untreated GERD can sometimes cause serious complications in children and adolescents over time, including

- esophagitis—irritation of the esophagus from refluxed stomach acid that damages the lining and causes sores, called ulcers, or bleeding. Children and adolescents who have chronic esophagitis over many years are more likely to develop precancerous changes in the esophagus during adulthood.
- strictures that lead to swallowing difficulties.
- respiratory problems, such as trouble breathing.

A pediatrician should monitor children and adolescents with GERD to prevent or treat long-term complications.

## Eating, Diet, and Nutrition

Children and adolescents with GERD can often reduce reflux by avoiding foods and drinks that worsen symptoms. Other dietary changes that can help reduce symptoms include decreasing fat intake and eating

small, frequent meals instead of three large meals. Children and adolescents who are overweight can talk with a pediatrician about dietary changes that can help them lose weight, which may decrease GERD symptoms.

### Points to Remember

- Gastroesophageal reflux (GER) occurs when stomach contents flow back up into the esophagus.
- GER is also called acid reflux or acid regurgitation because the stomach's digestive juices contain acid.
- Gastroesophageal reflux disease (GERD) is a more serious, chronic form of GER.
- GERD results when the lower esophageal sphincter becomes weak or relaxes when it should not, causing stomach contents to rise up into the esophagus.
- In older children and adolescents, the main symptom of GERD is frequent heartburn. Most children with GERD who are younger than 12 do not have heartburn.
- Other common GERD symptoms include a chronic cough, asthma or recurrent pneumonia, nausea, difficulty swallowing or painful swallowing, and pain in the chest.
- A pediatrician may refer children and adolescents with suspected GERD to a pediatric gastroenterologist for diagnosis and treatment.
- Treatment for GERD for children and adolescents may involve one or more of the following, depending on the severity of symptoms: lifestyle changes, medications, or surgery.
- A pediatrician should monitor children and adolescents with GERD to prevent or treat long-term complications.

## Hope through Research

The Division of Digestive Diseases and Nutrition at the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) supports basic and clinical research into GI diseases, including GER and GERD.

Clinical trials are research studies involving people. Clinical trials look at safe and effective new ways to prevent, detect, or treat disease. Researchers also use clinical trials to look at other aspects of care, such as improving the quality of life for people with chronic illnesses. To learn more about clinical trials, why they matter, and how to participate, visit the NIH Clinical Research Trials and You website at [www.nih.gov/health/clinicaltrials](http://www.nih.gov/health/clinicaltrials). For information about current studies, visit [www.ClinicalTrials.gov](http://www.ClinicalTrials.gov).

## For More Information

### **North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN)**

P.O. Box 6  
Flourtown, PA 19031  
Phone: 215-233-0808  
Fax: 215-233-3918  
Email: [naspghan@naspghan.org](mailto:naspghan@naspghan.org)  
Internet: [www.naspghan.org](http://www.naspghan.org)

### **Pediatric/Adolescent Gastroesophageal Reflux Association**

P.O. Box 7728  
Silver Spring, MD 20907  
Phone: 301-601-9541  
Email: [gergroup@aol.com](mailto:gergroup@aol.com)  
Internet: [www.reflux.org](http://www.reflux.org)

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This information was prepared in partnership with the NASPGHAN, the NASPGHAN Foundation for Children's Digestive Health and Nutrition, and the Association of Pediatric Gastroenterology and Nutrition Nurses (APGNN). The information is intended only to provide general information and not as a definitive basis for diagnosis or treatment in any particular case. You should consult your child's pediatrician about your child's specific condition.



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## National Digestive Diseases Information Clearinghouse

2 Information Way  
Bethesda, MD 20892-3570  
Phone: 1-800-891-5389  
TTY: 1-866-569-1162  
Fax: 703-738-4929  
Email: [nddic@info.niddk.nih.gov](mailto:nddic@info.niddk.nih.gov)  
Internet: [www.digestive.niddk.nih.gov](http://www.digestive.niddk.nih.gov)

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