

# Gas in the Digestive Tract

*National Digestive Diseases Information Clearinghouse*

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Everyone has gas and eliminates it by burping or passing it through the rectum. However, many people think they have too much gas when they really have normal amounts. Most people produce about 1 to 4 pints a day and pass gas about 14 times a day.

Gas is made primarily of odorless vapors—carbon dioxide, oxygen, nitrogen, hydrogen, and sometimes methane. The unpleasant odor of flatulence, the gas that passes through the rectum, comes from bacteria in the large intestine that release small amounts of gases containing sulfur.

Although having gas is common, it can be uncomfortable and embarrassing. Understanding causes, ways to reduce symptoms, and treatment will help most people find relief.

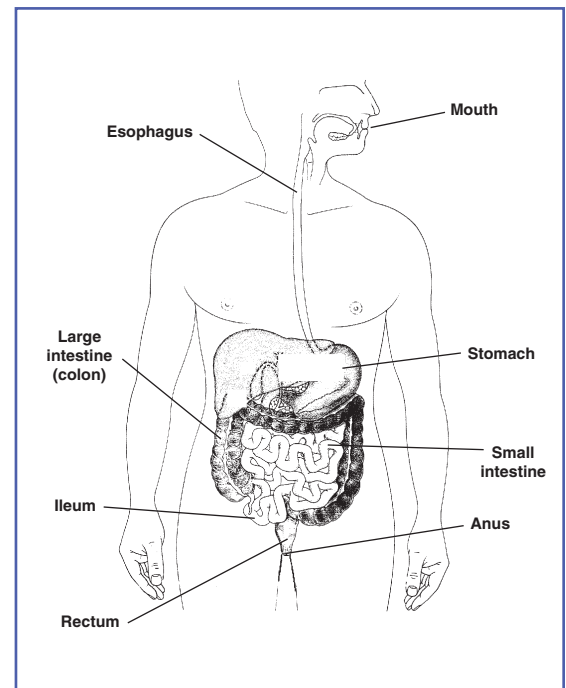
## What causes gas?

Gas in the digestive tract—the esophagus, stomach, small intestine, and large intestine—comes from two sources:

- swallowed air
- normal breakdown of certain undigested foods by harmless bacteria naturally present in the large intestine, also called the colon

## Swallowed Air

Aerophagia, or air swallowing, is a common cause of gas in the stomach. Everyone swallows small amounts of air when eating and drinking. However, eating or drinking rapidly, chewing gum, smoking, or wearing



*The digestive tract.*

loose dentures can cause some people to take in more air.

Burping, or belching, is the way most swallowed air—which contains nitrogen, oxygen, and carbon dioxide—leaves the stomach. The remaining gas moves into the small intestine, where it is partially absorbed. A small amount travels into the large intestine for release through the rectum. The stomach also releases carbon dioxide when stomach acid mixes with the bicarbonate in digestive juices, but most of this gas is absorbed into the bloodstream and does not enter the large intestine.

## Breakdown of Undigested Foods

The body does not digest and absorb some carbohydrates—the sugar, starches, and fiber found in many foods—in the small intestine because of a shortage or absence of certain enzymes that aid digestion.

This undigested food then passes from the small intestine into the large intestine, where normal, harmless bacteria break down the food, producing hydrogen, carbon dioxide, and, in about one-third of all people, methane. Eventually these gases exit through the rectum.

People who make methane do not necessarily pass more gas or have unique symptoms. A person who produces methane will have stools that consistently float in water. Research has not shown why some people produce methane and others do not.

Foods that produce gas in one person may not cause gas in another. Some common bacteria in the large intestine can destroy the hydrogen that other bacteria produce. The balance of the two types of bacteria may explain why some people have more gas than others.

## Which foods cause gas?

Most foods that contain carbohydrates can cause gas. By contrast, fats and proteins cause little gas.

### Sugars

The sugars that cause gas are raffinose, lactose, fructose, and sorbitol.

**Raffinose.** Beans contain large amounts of this complex sugar. Smaller amounts are found in cabbage, brussels sprouts, broccoli, asparagus, other vegetables, and whole grains.

**Lactose.** Lactose is the natural sugar in milk. It is also found in milk products, such as cheese and ice cream, and processed foods, such as bread, cereal, and salad dressing. Many people, particularly those of African, Native American, or Asian background, normally have low levels of lactase, the enzyme needed to digest lactose, after childhood. Also, as people age, their enzyme levels decrease. As a result, over time people may experience increasing amounts of gas after eating food containing lactose.

**Fructose.** Fructose is naturally present in onions, artichokes, pears, and wheat. It is also used as a sweetener in some soft drinks and fruit drinks.

**Sorbitol.** Sorbitol is a sugar found naturally in fruits, including apples, pears, peaches, and prunes. It is also used as an artificial sweetener in many dietetic foods and sugar-free candies and gums.

### Starches

Most starches, including potatoes, corn, pasta, and wheat, produce gas as they are broken down in the large intestine. Rice is the only starch that does not cause gas.

### Fiber

Many foods contain soluble and insoluble fiber. Soluble fiber dissolves easily in water and takes on a soft, gel-like texture in the intestines. Found in oat bran, beans, peas, and most fruits, soluble fiber is not broken down until it reaches the large intestine, where digestion causes gas.

Insoluble fiber, on the other hand, passes essentially unchanged through the intestines and produces little gas. Wheat bran and some vegetables contain this kind of fiber.

## What are some symptoms and problems of gas?

The most common symptoms of gas are flatulence, abdominal bloating, abdominal pain, and belching. However, not everyone experiences these symptoms. The type and degree of symptoms probably depends on how much gas the body produces, how many fatty acids the body absorbs, and a person's sensitivity to gas in the large intestine.

### Belching

An occasional belch during or after meals is normal and releases gas when the stomach is full of food. However, people who belch frequently may be swallowing too much air and releasing it before the air enters the stomach.

Sometimes a person with chronic belching may have an upper gastrointestinal (GI) disorder, such as peptic ulcer disease, gastroesophageal reflux disease (GERD), or gastroparesis, also called delayed gastric emptying.

Sometimes people believe that swallowing air and releasing it will relieve the discomfort of these disorders, and they may intentionally or unintentionally develop a habit of belching to relieve discomfort.

Gas-bloat syndrome may occur after fundoplication surgery to correct GERD. The surgery creates a one-way valve between the esophagus and stomach that allows food and gas to enter the stomach but often prevents normal belching and the ability to vomit. It occurs in about 10 percent of people who have this surgery but may improve with time.

### Flatulence

Another common complaint is too much flatulence. However, most people do not realize that passing gas 14 to 23 times a day is normal. Too much gas may be the result of carbohydrate malabsorption.

### Abdominal Bloating

Many people believe that too much gas causes abdominal bloating. However, people who complain of bloating from gas often have normal amounts and distribution of gas. They may just be unusually aware of gas in the digestive tract.

Doctors believe that bloating is usually the result of an intestinal disorder, such as irritable bowel syndrome (IBS). The cause of IBS is unknown but may involve abnormal movements and contractions of intestinal muscles and increased pain sensitivity in the intestines. These disorders may give a sensation of bloating because of increased sensitivity to gas.

Any disease that causes intestinal inflammation or obstruction, such as Crohn's disease or colon cancer, may also cause abdominal bloating. In addition, people who have had many operations, internal hernias, or bands of internal scar tissue called adhesions may experience bloating or pain. Finally, eating a lot of fatty food can delay stomach emptying and cause bloating and discomfort, but not necessarily too much gas.

### Abdominal Pain and Discomfort

Some people have pain when gas is present in the intestine. When pain is on the left side of the colon, it can be confused with heart disease, which sometimes causes abdominal pain. When the pain is on the right side of the colon, it may mimic gallstones or appendicitis.

## What diagnostic tests are used to find the cause of gas?

Because gas symptoms may be caused by a serious disorder, those causes should be ruled out. Health professionals usually begin with a review of dietary habits and symptoms. The health professional may ask the patient to keep a diary of foods and beverages consumed for a specific time period.

If lactase deficiency is the suspected cause of gas, the health professional may suggest avoiding milk products for a period of time. A blood or breath test may be used to diagnose lactose intolerance.

In addition, to determine if someone produces too much gas in the colon or is unusually sensitive to the passage of normal gas volumes, the health professional may ask a patient to count the number of times he passes gas during the day and include this information in a diary.

Careful review of diet and the amount of gas passed may help relate specific foods to symptoms and determine the severity of the problem.

Because the symptoms that people may have are so variable, the health professional may order other types of diagnostic tests in addition to a physical exam, depending on the patient's symptoms and other factors.

## How is gas treated?

Experience has shown that the most common ways to reduce the discomfort of gas are changing diet, taking medicines, and reducing the amount of air swallowed.

### Diet

Health professionals may tell people to eat fewer foods that cause gas. However, for some people this may mean cutting out healthy foods, such as fruits and vegetables, whole grains, and milk products.

Health professionals may also suggest limiting high-fat foods to reduce bloating and discomfort. Less fat in the diet helps the stomach empty faster, allowing gases to move into the small intestine.

Unfortunately, the amount of gas caused by certain foods varies from person to person. Effective dietary changes depend on learning through trial and error how much of the offending foods one can handle.

### Nonprescription Medicines

Digestive enzymes, available as over-the-counter supplements, help digest carbohydrates and may allow people to eat foods that normally cause gas.

The enzyme lactase, which aids with lactose digestion, is available in caplet and chewable tablet form without a prescription; Lactaid and Lactrase are two common brands. Taking lactase supplements just before eating helps digest foods that contain lactose. Also, lactose-reduced milk and other products, such as Lactaid and Dairy Ease, are available at many grocery stores.

Beano, an over-the-counter digestive aid, contains the sugar-digesting enzyme that the body lacks to digest the sugar in beans and many vegetables. The enzyme comes in liquid and tablet form. Five drops are added per serving or one tablet is swallowed just before eating to break down the gas-producing sugars. Beano has no effect on gas caused by lactose or fiber.

### Prescription Medicines

Doctors may prescribe medicines to help reduce symptoms, especially for people with a disorder such as IBS. For more information about IBS, see the *Irritable Bowel Syndrome* fact sheet from the National Digestive Diseases Information Clearinghouse.

### Reducing Swallowed Air

For those who have chronic belching, health professionals may suggest ways to reduce the amount of air swallowed. Two options are to avoid chewing gum and to avoid eating hard candy. Eating at a slow pace and checking with a dentist to make sure dentures fit properly should also help.

This publication may contain information about medications used to treat a health condition. When this publication was prepared, the NIDDK included the most current information available. Occasionally, new information about medication is released. For updates or for questions about any medications, please contact the U.S. Food and Drug Administration at 1-888-INFO-FDA (463-6332), a toll-free call, or visit their website at [www.fda.gov](http://www.fda.gov). Consult your doctor for more information.

### Points to Remember

Although gas may be uncomfortable and embarrassing, it is not life threatening. Understanding causes, ways to reduce symptoms, and treatment will help most people find some relief.

- Everyone has gas in the digestive tract.
- People often believe normal passage of gas to be excessive.
- Gas comes from two main sources: swallowed air and normal breakdown of certain foods by harmless bacteria naturally present in the large intestine.
- Many foods with carbohydrates can cause gas. Fats and proteins cause little gas.
- Foods that may cause gas include
  - beans
  - vegetables, such as broccoli, cabbage, brussels sprouts, onions, artichokes, and asparagus
  - fruits, such as pears, apples, and peaches
  - whole grains, such as whole wheat and bran
  - soft drinks and fruit drinks
  - milk and milk products, such as cheese and ice cream, and packaged foods prepared with lactose, such as bread, cereal, and salad dressing
  - foods containing sorbitol, such as dietetic foods and sugar-free candies and gums
- The most common symptoms of gas are belching, flatulence, bloating, and abdominal pain. However, some of these symptoms may be caused by an intestinal disorder, such as IBS, rather than too much gas.
- The most common ways to reduce the discomfort of gas are changing one's diet, taking digestive enzymes to help digest carbohydrates, and reducing the amount of air swallowed.



## For More Information

### American Dietetic Association

120 South Riverside Plaza, Suite 2000  
Chicago, IL 60606-6995  
Phone: 1-800-877-1600 or 312-899-0040  
Fax: 312-899-4739  
Email: [hotline@eatright.org](mailto:hotline@eatright.org)  
Internet: [www.eatright.org](http://www.eatright.org)

### International Foundation for Functional Gastrointestinal Disorders

P.O. Box 170864  
Milwaukee, WI 53217-8076  
Phone: 1-888-964-2001 or 414-964-1799  
Fax: 414-964-7176  
Email: [iffgd@iffgd.org](mailto:iffgd@iffgd.org)  
Internet: [www.iffgd.org](http://www.iffgd.org)

You may also find additional information on this topic using the following databases:

The NIDDK Reference Collection is a collection of thousands of materials produced for patients and health care professionals, including fact sheets, brochures, and audiovisual materials. Visit [www.catalog.niddk.nih.gov/resources](http://www.catalog.niddk.nih.gov/resources).

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## National Digestive Diseases Information Clearinghouse

2 Information Way  
Bethesda, MD 20892-3570  
Phone: 1-800-891-5389  
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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Publications produced by the Clearinghouse are carefully reviewed by both NIDDK scientists and outside experts.

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