



## Gas in the Digestive Tract

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 3 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 comes from bacteria in the large intestine that release small amounts of gases that contain 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 (that is, 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 (colon)

### **Swallowed Air:**

Air swallowing (aerophagia) 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 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 and bicarbonate mix, 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. This undigested food then passes from the small intestine into the large intestine, where harmless and normal 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, Hispanic, or Asian background, have levels of the enzyme lactase needed to lactose. 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 fruit 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, noodles, and wheat, produce gas as they are broken down in the large intestine. 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, 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 intestine and produces little gas. Wheat and some vegetables contain this kind of fiber.

### **What are some symptoms and problems of gas?**

The most common symptoms of gas are belching, flatulence, abdominal bloating, and abdominal pain. However, not everyone experiences these symptoms. The determining factors probably are how much gas the body produces, how many fatty acids the body absorbs, and a person's sensitivity to gas in the large intestine. Chronic symptoms caused by too much gas or by a serious disease are rare.

### **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 GI disorder, such as peptic ulcer disease, gastroesophageal reflux disease (GERD), or gastritis. Believing that swallowing air and releasing it will relieve the discomfort of these disorders; this person may unintentionally develop a habitual cycle of belching and discomfort. Frequently, the pain continues or worsens, leading the person to believe he or she has a serious



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disorder. Two rare chronic gas syndromes are associated with belching: Meganblase syndrome and gas-bloat syndrome. The Meganblase syndrome, which causes chronic belching, is characterized by severe air swallowing and an enlarged bubble of gas in the stomach following heavy meals. The resulting fullness and shortness of breath may mimic a heart attack. Gas-bloat syndrome may occur after 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.

### **Flatulence:**

Another common complaint is passage of too much gas through the rectum (flatulence). However, most people do not realize that passing gas 14 to 23 times a day is normal. Although rare, too much gas may be the result of severe carbohydrate malabsorption or overactive bacteria in the colon.

### **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 actually may be unusually aware of gas in the digestive tract. Doctors believe that bloating is usually the result of an intestinal motility disorder, such as IBS. Motility disorders are characterized by abnormal movements and contraction of intestinal muscles. These disorders give a false sensation of bloating because of increased sensitivity to gas. Splenic-flexure syndrome is a chronic disorder that seems to be caused by trapped gas at bends (flexures) in the colon. Symptoms include bloating, muscle spasms and upper abdominal discomfort. Splenic-flexure syndrome often accompanies IBS. Any disease that causes intestinal obstruction such as Crohn's disease or colon cancer may also cause abdominal bloating. In addition, people who have had many operations, adhesions (scar tissue), or internal hernias 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 gas collects on the left side of the colon, the pain can be confused with heart disease. When it collects on the right side of the colon, the pain may feel like the pain associated with gallstones or appendicitis.

### **What diagnostic tests are used?**

Because gas symptoms may be caused by a serious disorder, those causes should be ruled out. The doctor usually begins with a review of dietary habits and symptoms. The doctor 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 doctor 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 doctor may ask patients to count the number of times they pass 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. If a patient complains of bloating, the doctor may examine the abdomen

for the sound of fluid movement to rule out Ascites (build up of fluid in the abdomen) and for signs of inflammation to rule out disease of the colon. The possibility of colon cancer is usually considered in people 50 years of age and older and in those with a family history of colorectal cancer, particularly if they have never had a colon examination (sigmoidoscopy or colonoscopy). These tests may also be appropriate for some or with unexplained weight loss, diarrhea, or blood not visible in the stool. For those with chronic belching, the doctor will look for signs or causes of excessive swallowing. If needed, an upper GI series (x-ray to view the esophagus, stomach, and upper small intestine) may be performed to rule out disease.

### **How is gas treated?**

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

#### **Diet:**

Doctors 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 grain and milk products. Doctors may also suggest limiting high-fat foods to reduce bloating and discomfort. This 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:**

Many nonprescription, over-the-counter medicines are available to help reduce symptoms, including antacids with simethicone and activated charcoal. Digestive enzymes, such as lactase supplements, actually help digest carbohydrates and may allow people to eat foods that normally cause gas.

Antacids, such as Mylanta II®, Maalox IT® and Di-Gel®, contain simethicone, a foaming agent that joins gas bubbles in the stomach so that gas is more easily belched away. However, these medicines have no effect on intestinal gas. The recommended dose is 2 to 4 tablespoons of the simethicone preparation taken 1/2 to 2 hours after meals. Activated charcoal tablets (Charcocoaps) may provide relief from gas in the colon. Studies have shown that when taken before and after a meal, intestinal gas is greatly reduced. The usual dose is 2 to 4 tablets taken just before eating and 1 hour after meals.

The enzyme lactase, which aids with lactose digestion, is available in liquid and tablet form without a prescription (Lactaid, Lactase, and Dairy Ease). Adding a few drops of liquid lactase to milk before drinking it or chewing lactase tablets just before eating helps digest foods that contain lactose. Also, lactose-reduced milk and other products are available at many grocery stores (Lactaid and Dairy Ease). Beano, a newer 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 form. Three to 10 drops are added per serving 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 motility disorder, such as IBS. Pro-motility or pro-kinetic drugs, such as metoclopramide (Reglan) and cisapride (Propulsid), may move gas through the digestive tract quickly.

#### **Reducing Swallowed Air:**

For those who have chronic belching, doctors may suggest ways to reduce the amount of air swallowed. Recommendations 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.

#### **Conclusion:**

Regional Digestive Consultants | Phone: 281-528-1511 | Fax: 281-419-8485 | Website: [www.rdcctx.com](http://www.rdcctx.com) | Email: [Info@rgdctx.com](mailto:Info@rgdctx.com)



## **Gas in the Digestive Tract**

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.