

# Lower GI Series

*National Digestive Diseases Information Clearinghouse*



## What is a lower gastrointestinal (GI) series?

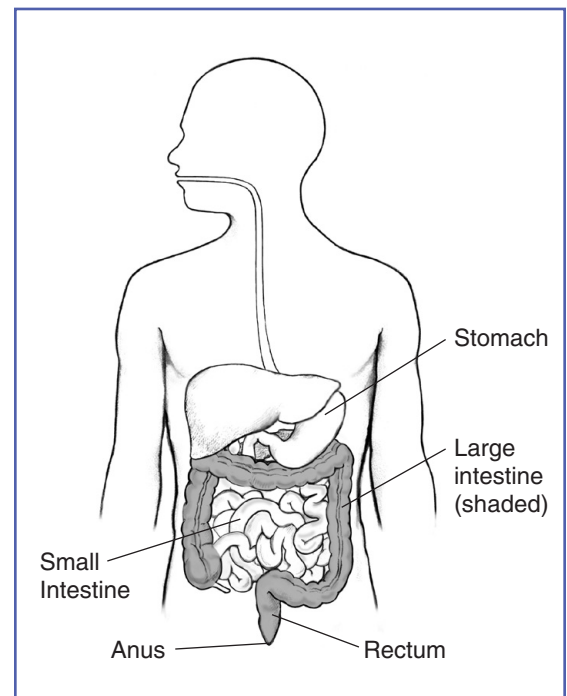
A lower GI series, also called a barium enema, is an x-ray exam used to help diagnose problems of the large intestine. An x-ray is a picture created by using radiation and recorded on film or on a computer. To make the large intestine more visible on x-ray, a health care provider will fill the person's intestine with a chalky liquid called barium. The two types of lower GI series are

- a single-contrast lower GI series, which uses only barium during the test
- a double-contrast or air-contrast lower GI series, which uses a combination of barium and air to create a more detailed view of the large intestine

The health care provider and radiologist—a doctor who specializes in medical imaging—will work together to determine which exam to perform.

## What is the large intestine?

The large intestine is part of the GI tract, a series of hollow organs joined in a long, twisting tube from the mouth to the anus—a 1-inch-long opening through which stool leaves the body. The body digests food using the movement of muscles in the GI tract, along with the release of hormones and enzymes. Organs that make up the GI tract are the mouth, esophagus, stomach, small intestine, large intestine—which includes the appendix, cecum, colon, and rectum—and anus. The intestines are sometimes called the bowel. The last part of the GI tract—called



The large intestine is part of the GI tract.

the lower GI tract—consists of the large intestine and anus.

The large intestine is about 5 feet long in adults and absorbs water and any remaining nutrients from partially digested food passed from the small intestine. The large intestine then changes waste from liquid to a solid matter called stool. Stool passes from the colon to the rectum. The rectum is 6 to 8 inches long in adults and is located between the last part of the colon—called the sigmoid colon—and the anus. The rectum stores stool prior to a bowel movement. During a bowel movement, stool moves from the rectum to the anus.

## Why is a lower gastrointestinal series performed?

A lower GI series can help diagnose the cause of

- abdominal pain
- bleeding from the anus
- changes in bowel habits
- chronic diarrhea
- unexplained weight loss

A lower GI series can also show

- cancerous growths.
- diverticula—small pouches in the colon.
- a fistula—an abnormal passage, or tunnel, between two organs, called an internal fistula, or between an organ and the outside of the body, called an external fistula. Fistulas occur most often in the areas around the rectum and anus.
- inflammation, or swelling, of the intestinal lining.
- polyps—extra pieces of tissue that grow on the lining of the intestine.
- ulcers—sores on the intestinal lining.

## How does a person prepare for a lower gastrointestinal series?

A person prepares for a lower GI series by

- talking with a health care provider
- cleansing the bowel

**Talking with a health care provider.** People should talk with their health care provider

- about medical conditions they have

- about all prescribed and over-the-counter medications, vitamins, and supplements they take
- if they've had a colonoscopy with a biopsy or polyp removal in the last 4 weeks

Women should let their health care provider know if they may be pregnant to avoid potential risks to the developing baby. The health care provider will take special precautions to minimize exposure to radiation, or he or she may suggest a different procedure.

**Cleansing the bowel.** The health care provider will give written bowel prep instructions to follow at home. The health care provider orders a bowel prep so that little to no stool is present inside the person's intestine. A complete bowel prep lets the person pass stool that is clear. Stool inside the colon can prevent the x ray from making a clear image of the intestine. Instructions may include following a clear liquid diet for 1 to 3 days before the procedure and avoiding drinks that contain red or purple dye. The instructions will provide specific direction about when to start and stop the clear liquid diet. During this diet, people may drink or eat the following:

- fat-free bouillon or broth
- gelatin in flavors such as lemon, lime, or orange
- plain coffee or tea, without cream or milk
- sports drinks in flavors such as lemon, lime, or orange
- strained fruit juice, such as apple or white grape—orange juice is not recommended
- water

The person needs to take laxatives and enemas the night before a lower GI series. A laxative is medication that loosens stool and increases bowel movements. An enema involves flushing water or laxative into the rectum using a special wash bottle. Laxatives and enemas can cause diarrhea, so the person should stay close to a bathroom during the bowel prep.

A person may take laxatives swallowed as a pill or as a powder dissolved in water. Some people will need to drink a large amount, usually a gallon, of liquid laxative over the course of the bowel prep at scheduled times. People may find this step difficult; however, it is very important to complete the prep. The images will not be clear if the prep is incomplete.

People should call their health care provider if they are having side effects that make them feel they can't finish the prep.

## How is a lower gastrointestinal series performed?

An x-ray technician and a radiologist perform a lower GI series at a hospital or an outpatient center. A person does not need anesthesia. The procedure usually takes 30 to 60 minutes.

For the test,

- the person lies on a table while the radiologist inserts a flexible tube into the person's anus and fills the large intestine with barium
- the radiologist prevents leaking of barium from the anus by inflating a balloon on the end of the tube
- the technician may ask the person to change position several times to evenly coat the large intestine with the barium

- if the health care provider has ordered a double-contrast lower GI series, the radiologist will inject air through the tube to inflate the intestine

During the test, the person may have some discomfort and feel the urge to have a bowel movement.

The person will need to hold still in various positions while the radiologist and technician take x-ray images and possibly x-ray video, called fluoroscopy. The radiologist and technician will view the large intestine from different angles.

When the imaging is complete, the radiologist or technician will deflate the balloon on the tube, and most of the barium will drain through the tube. The person will expel the remaining barium into a bedpan or nearby toilet. A nurse or technician may give the person an enema to further flush out the barium.

## What can a person expect after a lower gastrointestinal series?

After a lower GI series, a person can expect the following:

- abdominal cramps and bloating that may occur for a short time after the procedure
- to resume most normal activities after leaving the hospital or outpatient center
- barium in the large intestine that causes stools to be white or light colored for several days after the procedure

A person should carefully read and follow the discharge instructions, which will explain how to flush the remaining barium from the intestine. The radiologist will interpret the images and send a report of the findings to the person's health care provider.

## What are the risks of a lower gastrointestinal series?

The risks of a lower GI series include

- constipation from the barium enema—the most common complication of a lower GI series.
- an allergic reaction to the barium.
- bowel obstruction—partial or complete blockage of the small or large intestine. Although rare, bowel obstruction can be a life-threatening condition that requires emergency medical treatment.
- leakage of barium into the abdomen—the area between the chest and the hips—through an undetected tear or hole in the lining of the large intestine. This complication is rare; however, it usually requires emergency surgery to repair.

Radiation exposure can cause cancer, although the level of radiation exposure that leads to cancer is unknown. Health care providers estimate the risk of cancer from this type of test to be small.

### Seek Immediate Care

People who have any of the following symptoms after a lower GI series should seek immediate medical attention:

- severe abdominal pain
- bloody bowel movements or bleeding from the anus
- inability to pass gas
- fever
- severe constipation

## Points to Remember

- A lower gastrointestinal (GI) series, also called a barium enema, is an x-ray exam used to help diagnose problems of the large intestine.
- A lower GI series can help diagnose the cause of
  - abdominal pain
  - bleeding from the anus
  - changes in bowel habits
  - chronic diarrhea
  - unexplained weight loss
- A person prepares for a lower GI series by
  - talking with a health care provider
  - cleansing the bowel
- The health care provider orders a bowel prep so that little to no stool is present inside the person's intestine.
- People should call their health care provider if they are having side effects that make them feel they can't finish the prep.
- An x-ray technician and a radiologist perform a lower GI series at a hospital or an outpatient center. A person does not need anesthesia. The procedure usually takes 30 to 60 minutes.
- After a lower GI series, a person can expect the following:
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  - severe constipation

## Hope through Research

The National Institute of Diabetes and Digestive and Kidney Diseases' (NIDDK's) Division of Digestive Diseases and Nutrition supports research into digestive conditions.

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

Read more about other diagnostic tests in these publications at [www.digestive.niddk.nih.gov](http://www.digestive.niddk.nih.gov):

- *Colonoscopy*
- *ERCP (Endoscopic Retrograde Cholangiopancreatography)*
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Publications produced by the Clearinghouse are carefully reviewed by both NIDDK scientists and outside experts. This publication was originally reviewed by M. Brian Fennerty, M.D., Oregon Health and Science University.

You may also find additional information about this topic by visiting MedlinePlus at [www.medlineplus.gov](http://www.medlineplus.gov).

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