

Digestive Diseases  
Home

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A service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), NIH

Digestive Diseases

Statistics

Clinical Trials

in Spanish

Resources

Order

About Us

Search

Home : [Digestive Diseases A-Z List of Topics and Titles](#) : Crohn's Disease

## Crohn's Disease

[Email To A Friend](#)

On this page:

- [What causes Crohn's disease?](#)
- [What are the symptoms?](#)
- [How is Crohn's disease diagnosed?](#)
- [What are the complications of Crohn's disease?](#)
- [What is the treatment for Crohn's disease?](#)
- [Can diet control Crohn's disease?](#)
- [Is pregnancy safe for women with Crohn's disease?](#)
- [Hope Through Research](#)
- [For More Information](#)

Crohn's disease causes inflammation in the small intestine. Crohn's disease usually occurs in the lower part of the small intestine, called the ileum, but it can affect any part of the digestive tract, from the mouth to the anus. The inflammation extends deep into the lining of the affected organ. The inflammation can cause pain and can make the intestines empty frequently, resulting in diarrhea.

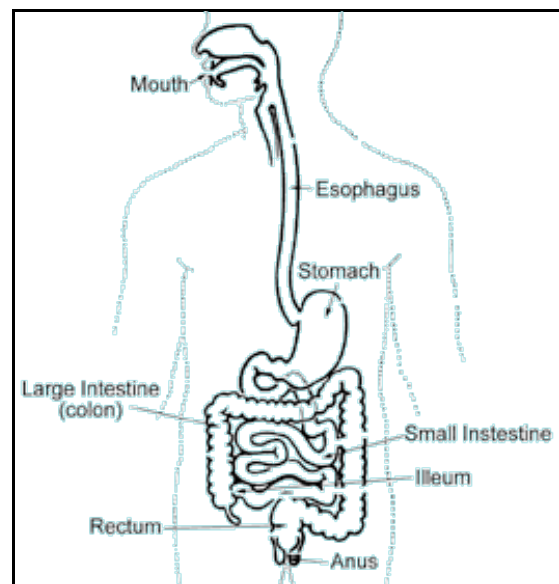
Crohn's disease is an inflammatory bowel disease (IBD), the general name for diseases that cause inflammation in the intestines. Crohn's disease can be difficult to diagnose because its symptoms are similar to other intestinal disorders such as irritable bowel syndrome and to another type of IBD called ulcerative colitis. Ulcerative colitis causes inflammation and ulcers in the top layer of the lining of the large intestine.

Crohn's disease affects men and women equally and seems to run in some families. About 20 percent of people with Crohn's disease have a blood relative with some form of IBD, most often a brother or sister and sometimes a parent or child.

Crohn's disease may also be called ileitis or enteritis.

[\[Top\]](#)

### What causes Crohn's disease?



The digestive system.

Theories about what causes Crohn's disease abound, but none has been proven. The most popular theory is that the body's immune system reacts to a virus or a bacterium by causing ongoing inflammation in the intestine.

People with Crohn's disease tend to have abnormalities of the immune system, but doctors do not know whether these abnormalities are a cause or result of the disease. Crohn's disease is not caused by emotional distress.

[\[Top\]](#)

## What are the symptoms?

The most common symptoms of Crohn's disease are abdominal pain, often in the lower right area, and diarrhea. Rectal bleeding, weight loss, and fever may also occur. Bleeding may be serious and persistent, leading to anemia. Children with Crohn's disease may suffer delayed development and stunted growth.

[\[Top\]](#)

## How is Crohn's disease diagnosed?

A thorough physical exam and a series of tests may be required to diagnose Crohn's disease.

Blood tests may be done to check for anemia, which could indicate bleeding in the intestines. Blood tests may also uncover a high white blood cell count, which is a sign of inflammation somewhere in the body. By testing a stool sample, the doctor can tell if there is bleeding or infection in the intestines.

The doctor may do an upper gastrointestinal (GI) series to look at the small intestine. For this test, the patient drinks barium, a chalky solution that coats the lining of the small intestine, before x rays are taken. The barium shows up white on x-ray film, revealing inflammation or other abnormalities in the intestine.

The doctor may also do a colonoscopy. For this test, the doctor inserts an endoscope—a long, flexible, lighted tube linked to a computer and TV monitor—into the anus to see the inside of the large intestine. The doctor will be able to see any inflammation or bleeding. During the exam, the doctor may do a biopsy, which involves taking a sample of tissue from the lining of the intestine to view with a microscope.

If these tests show Crohn's disease, more x rays of both the upper and lower digestive tract may be necessary to see how much is affected by the disease.

[\[Top\]](#)

## What are the complications of Crohn's disease?

The most common complication is blockage of the intestine. Blockage occurs because the disease tends to thicken the intestinal wall with swelling and scar tissue, narrowing the passage. Crohn's disease may also cause sores, or ulcers, that tunnel through the affected area into surrounding tissues such as the bladder, vagina, or skin. The areas around the anus and rectum are often involved. The tunnels, called fistulas, are a common complication and often become infected. Sometimes fistulas can be treated with medicine, but in some cases they may require surgery.

Nutritional complications are common in Crohn's disease. Deficiencies of proteins, calories, and vitamins are well documented in Crohn's disease. These deficiencies

may be caused by inadequate dietary intake, intestinal loss of protein, or poor absorption (malabsorption).

Other complications associated with Crohn's disease include arthritis, skin problems, inflammation in the eyes or mouth, kidney stones, gallstones, or other diseases of the liver and biliary system. Some of these problems resolve during treatment for disease in the digestive system, but some must be treated separately.

[\[Top\]](#)

## What is the treatment for Crohn's disease?

Treatment for Crohn's disease depends on the location and severity of disease, complications, and response to previous treatment. The goals of treatment are to control inflammation, correct nutritional deficiencies, and relieve symptoms like abdominal pain, diarrhea, and rectal bleeding. Treatment may include drugs, nutrition supplements, surgery, or a combination of these options. At this time, treatment can help control the disease, but there is no cure.

Some people have long periods of remission, sometimes years, when they are free of symptoms. However, the disease usually recurs at various times over a person's lifetime. This changing pattern of the disease means one cannot always tell when a treatment has helped. Predicting when a remission may occur or when symptoms will return is not possible.

Someone with Crohn's disease may need medical care for a long time, with regular doctor visits to monitor the condition.

### Drug Therapy

Most people are first treated with drugs containing mesalamine, a substance that helps control inflammation. Sulfasalazine is the most commonly used of these drugs. Patients who do not benefit from it or who cannot tolerate it may be put on other mesalamine-containing drugs, generally known as 5-ASA agents, such as Asacol, Dipentum, or Pentasa. Possible side effects of mesalamine preparations include nausea, vomiting, heartburn, diarrhea, and headache.

Some patients take corticosteroids to control inflammation. These drugs are the most effective for active Crohn's disease, but they can cause serious side effects, including greater susceptibility to infection.

Drugs that suppress the immune system are also used to treat Crohn's disease. Most commonly prescribed are 6-mercaptopurine and a related drug, azathioprine. Immunosuppressive agents work by blocking the immune reaction that contributes to inflammation. These drugs may cause side effects like nausea, vomiting, and diarrhea and may lower a person's resistance to infection. When patients are treated with a combination of corticosteroids and immunosuppressive drugs, the dose of corticosteroids can eventually be lowered. Some studies suggest that immunosuppressive drugs may enhance the effectiveness of corticosteroids.

The U.S. Food and Drug Administration has approved the drug infliximab (brand name, Remicade) for the treatment of moderate to severe Crohn's disease that does not respond to standard therapies (mesalamine substances, corticosteroids, immunosuppressive agents) and for the treatment of open, draining fistulas. Infliximab, the first treatment approved specifically for Crohn's disease, is an anti-tumor necrosis factor (TNF) substance. TNF is a protein produced by the immune system that may cause the inflammation associated with Crohn's disease. Anti-TNF removes TNF from the bloodstream before it reaches the intestines, thereby preventing inflammation. Investigators will continue to study patients taking

infliximab to determine its long-term safety and efficacy.

Antibiotics are used to treat bacterial overgrowth in the small intestine caused by stricture, fistulas, or prior surgery. For this common problem, the doctor may prescribe one or more of the following antibiotics: ampicillin, sulfonamide, cephalosporin, tetracycline, or metronidazole.

Diarrhea and crampy abdominal pain are often relieved when the inflammation subsides, but additional medication may also be necessary. Several antidiarrheal agents could be used, including diphenoxylate, loperamide, and codeine. Patients who are dehydrated because of diarrhea will be treated with fluids and electrolytes.

### Nutrition Supplementation

The doctor may recommend nutritional supplements, especially for children whose growth has been slowed. Special high-calorie liquid formulas are sometimes used for this purpose. A small number of patients may need periods of feeding by vein. This can help patients who need extra nutrition temporarily, those whose intestines need to rest, or those whose intestines cannot absorb enough nutrition from food.

### Surgery

Surgery to remove part of the intestine can help Crohn's disease but cannot cure it. The inflammation tends to return next to the area of intestine that has been removed. Many Crohn's disease patients require surgery, either to relieve symptoms that do not respond to medical therapy or to correct complications such as blockage, perforation, abscess, or bleeding in the intestine.

Some people who have Crohn's disease in the large intestine need to have their entire colon removed in an operation called colectomy. A small opening is made in the front of the abdominal wall, and the tip of the ileum is brought to the skin's surface. This opening, called a stoma, is where waste exits the body. The stoma is about the size of a quarter and is usually located in the right lower part of the abdomen near the beltline. A pouch is worn over the opening to collect waste, and the patient empties the pouch as needed. The majority of colectomy patients go on to live normal, active lives.

Sometimes only the diseased section of intestine is removed and no stoma is needed. In this operation, the intestine is cut above and below the diseased area and reconnected.

Because Crohn's disease often recurs after surgery, people considering it should carefully weigh its benefits and risks compared with other treatments. Surgery may not be appropriate for everyone. People faced with this decision should get as much information as possible from doctors, nurses who work with colon surgery patients (enterostomal therapists), and other patients. Patient advocacy organizations can suggest support groups and other information resources. (See [For More Information](#) for the names of such organizations.)

People with Crohn's disease may feel well and be free of symptoms for substantial spans of time when their disease is not active. Despite the need to take medication for long periods of time and occasional hospitalizations, most people with Crohn's disease are able to hold jobs, raise families, and function successfully at home and in society.

[\[Top\]](#)

## Can diet control Crohn's disease?

No special diet has been proven effective for preventing or treating this disease. Some people find their symptoms are made worse by milk, alcohol, hot spices, or fiber. People are encouraged to follow a nutritious diet and avoid any foods that seem to worsen symptoms. But there are no consistent rules.

People should take vitamin supplements only on their doctor's advice.

[\[Top\]](#)

## Is pregnancy safe for women with Crohn's disease?

Research has shown that the course of pregnancy and delivery is usually not impaired in women with Crohn's disease. Even so, women with Crohn's disease should discuss the matter with their doctors before pregnancy. Most children born to women with Crohn's disease are unaffected. Children who do get the disease are sometimes more severely affected than adults, with slowed growth and delayed sexual development in some cases.

[\[Top\]](#)

## Hope Through Research

Researchers continue to look for more effective treatments. Examples of investigational treatments include

- **Anti-TNF.** Research has shown that cells affected by Crohn's disease contain a cytokine, a protein produced by the immune system, called tumor necrosis factor (TNF). TNF may be responsible for the inflammation of Crohn's disease. Anti-TNF is a substance that finds TNF in the bloodstream, binds to it, and removes it before it can reach the intestines and cause inflammation. In studies, anti-TNF seems particularly helpful in closing fistulas.
- **Interleukin 10.** Interleukin 10 (IL-10) is a cytokine that suppresses inflammation. Researchers are now studying the effectiveness of synthetic IL-10 in treating Crohn's disease.
- **Antibiotics.** Antibiotics are now used to treat the bacterial infections that often accompany Crohn's disease, but some research suggests that they might also be useful as a primary treatment for active Crohn's disease.
- **Budesonide.** Researchers recently identified a new corticosteroid called budesonide that appears to be as effective as other corticosteroids but causes fewer side effects.
- **Methotrexate and cyclosporine.** These are immunosuppressive drugs that may be useful in treating Crohn's disease. One potential benefit of methotrexate and cyclosporine is that they appear to work faster than traditional immunosuppressive drugs.
- **Natalizumab.** Natalizumab is an experimental drug that reduces symptoms and improves the quality of life when tested in people with Crohn's disease. The drug decreases inflammation by binding to immune cells and preventing them from leaving the bloodstream and reaching the areas of inflammation.
- **Zinc.** Free radicals—molecules produced during fat metabolism, stress, and infection, among other things—may contribute to inflammation in Crohn's disease. Free radicals sometimes cause cell damage when they interact with

other molecules in the body. The mineral zinc removes free radicals from the bloodstream. Studies are under way to determine whether zinc supplementation might reduce inflammation.

[\[Top\]](#)

## For More Information

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Internet: <http://pcca.hypermart.net>

### **Reach Out for Youth with Ileitis and Colitis, Inc.**

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[\[Top\]](#)

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The National Digestive Diseases Information Clearinghouse (NDDIC) is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK is part of the National Institutes of Health under the U.S. Department of Health and Human Services. Established in 1980, the clearinghouse provides information about digestive diseases to people with digestive disorders and to their families, health care professionals, and the public. NDDIC answers inquiries, develops and distributes publications, and works closely with professional and

patient organizations and Government agencies to coordinate resources about digestive diseases.

Publications produced by the clearinghouse are carefully reviewed by both NIDDK scientists and outside experts.

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[\[Top\]](#)

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