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## Crohn's Disease

*Crohn's disease (regional enteritis, granulomatous ileitis, ileocolitis) is a chronic inflammation of the intestinal wall that may affect any part of the digestive tract.*

- Although the exact cause is unknown, an improperly functioning immune system may result in Crohn's disease.
- Typical symptoms include chronic diarrhea (which sometimes is bloody), crampy abdominal pain, fever, loss of appetite, and weight loss.
- The diagnosis is based on an examination of the large intestine with a flexible viewing tube (colonoscopy) and barium x-rays.
- There is no cure for Crohn's disease.
- Treatment is aimed at relieving symptoms and reducing inflammation, but some people require surgery.

The cause of Crohn's disease is not known for certain, but many researchers believe that a dysfunction of the immune system results in the intestine overreacting to an environmental, dietary, or infectious agent. Certain people may have a hereditary predisposition to this immune system dysfunction. Cigarette smoking seems to contribute to both the development and the periodic flare-ups (bouts or attacks) of Crohn's disease.

In the past few decades, Crohn's disease has become more common worldwide. However, it is most common among populations living in northern climates in developed areas of the world. It occurs about equally in both sexes, often runs in families, and appears to be more common among Ashkenazi Jews. Most people develop Crohn's disease before age 35, usually between the ages of 15 and 25.

Most commonly, Crohn's disease occurs in the last portion of the small intestine (ileum) and in the large intestine, but it can occur in any part of the digestive tract, from the mouth to the anus and even in the skin around the anus. Crohn's disease affects the small intestine alone (35% of people), the large intestine alone (20% of people), or both the last portion of the small intestine and the large intestine (45% of people). The disease may affect some segments of the intestinal tract while leaving normal segments (skip areas) between the affected areas. Where Crohn's disease is active, the full thickness of the bowel is usually involved.

### Symptoms and Complications

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### Pronunciations

amyloidosis  
 ankylosing spondylitis  
 arthritis  
 azathioprine  
 cholinergic

The most common early symptoms of Crohn's disease are chronic diarrhea (which sometimes is bloody), crampy abdominal pain, fever, loss of appetite, and weight loss. Symptoms may continue for days or weeks and may resolve without treatment. Complete and permanent recovery after a single attack is extremely rare. Crohn's disease almost always flares up at irregular intervals throughout a person's life. Flare-ups can be mild or severe, brief or prolonged. Severe flare-ups can lead to intense pain, dehydration, and blood loss. Why the symptoms come and go and what triggers new flare-ups or determines their severity is not known. Recurrent inflammation tends to appear in the same area of the intestine, but it may spread to adjacent areas after a diseased segment has been removed surgically.

Common complications of inflammation include scarring that can produce intestinal blockage (obstruction) and deep ulcers penetrating through the bowel wall that can create pus-filled pockets of infection (abscesses) or abnormal connecting channels between the intestine and other organs (fistulas). Fistulas may connect two different parts of the intestine. Fistulas also may connect the intestine and bladder or the intestine and the skin surface, especially around the anus. Although fistulas from the small intestine are common, wide-open holes (perforations) are rare.

When the large intestine is affected extensively by Crohn's disease, rectal bleeding commonly occurs. After many years, the risk of colon cancer (cancer of the large intestine) is greatly increased. About one third of people who develop Crohn's disease have problems around the anus, especially fistulas and cracks (fissures) in the lining of the mucus membrane of the anus. Crohn's disease may lead to complications in other parts of the body. These complications include gallstones, inadequate absorption of nutrients, urinary tract infections, kidney stones, and deposits of the protein amyloid in several organs (amyloidosis).

When Crohn's disease causes a flare-up of gastrointestinal symptoms, the person may also experience inflammation of the joints (arthritis), inflammation of the whites of the eyes (episcleritis), mouth sores (aphthous stomatitis), inflamed skin nodules on the arms and legs (erythema nodosum), and blue-red skin sores containing pus (pyoderma gangrenosum). Even when Crohn's disease is not causing a flare-up of gastrointestinal symptoms, the person still may experience pyoderma gangrenosum, while inflammation of the spine (ankylosing spondylitis), inflammation of the pelvic joints (sacroiliitis), inflammation inside the eye (uveitis), or inflammation of the bile ducts (primary sclerosing cholangitis) are liable to occur entirely without relation to the clinical activity of the bowel disease.

In children, gastrointestinal symptoms such as abdominal pain and diarrhea often are not the main symptoms and may not appear at all. Instead, the main symptoms may be slow growth, joint inflammation, fever, or weakness and fatigue resulting from anemia.

### Diagnosis

A doctor may suspect Crohn's disease in a person with recurring crampy abdominal pain and diarrhea, particularly if the person has a family history of Crohn's disease or a history of problems around the anus. Other clues to the diagnosis may include inflammation in the joints, eyes, or skin. The doctor may feel a lump or fullness in the lower part of the abdomen, most often on the right side.

No laboratory test specifically identifies Crohn's disease, but blood tests may show anemia, abnormally high numbers of white blood cells, low levels of the protein albumin, and other indications of inflammation such as an elevated level of C-reactive protein (CRP).

A colonoscopy (an examination of the large intestine with a flexible viewing tube) and a biopsy (removal of a tissue specimen for microscopic examination) are usually the first tests performed after a physical examination and blood tests have been completed.

If Crohn's disease is limited to the small intestine, a colonoscopy will not detect the disease unless the colonoscope is advanced all the way through the colon into

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the last part of the small intestine where the inflammation most often resides. However, Crohn's disease can almost always be detected on x-rays after barium is swallowed. X-rays taken after barium is given by enema can reveal the characteristic appearance of Crohn's disease in the large intestine. Computed tomography (CT) can show changes that are helpful in distinguishing between Crohn's disease and ulcerative colitis and is the best way to identify complications that occur outside the walls of the intestinal tract, such as abscesses or fistulas. Another way in which the small intestine can be evaluated is with wireless capsule endoscopy (see [Symptoms and Diagnosis of Digestive Disorders: Endoscopy](#)).



### Treatment and Prognosis

Although Crohn's disease has no known cure, many treatments help reduce inflammation and relieve symptoms.

**Antidiarrheal Drugs:** These drugs, which may relieve cramps and diarrhea (see [Symptoms and Diagnosis of Digestive Disorders: Drugs Used to Prevent or Treat Constipation](#)), include drugs that have anticholinergic effects (drugs that block certain pathways of the nervous system) (see [Aging and Drugs: Anticholinergic: What Does It Mean?](#)) such as diphenoxylate, loperamide, deodorized opium tincture, and codeine. They are taken by mouth—preferably before meals. Taking methylcellulose or psyllium preparations sometimes helps prevent anal irritation by making the stool firmer.

**Anti-inflammatory Drugs:** Sulfasalazine and related drugs such as mesalamine, olsalazine, and balsalazide reduce inflammation. These drugs can suppress symptoms when they occur and reduce inflammation, especially in the large intestine. Mesalamine may be effective in preventing recurrences. These drugs do not work as well for relieving severe flare-ups.

Corticosteroids such as prednisone, which is given by mouth, may dramatically reduce fever and diarrhea, relieve abdominal pain and tenderness, and improve appetite and sense of well-being. However, long-term corticosteroid therapy invariably results in side effects (see [Joint Disorders: Corticosteroids: Uses and Side Effects](#)). Usually, high doses are taken initially to relieve major inflammation and symptoms. The dose is then reduced and the drug is discontinued as soon as possible. A newer corticosteroid called budesonide has fewer side effects than prednisone, but it may not be quite as rapidly effective and usually does not prevent relapses beyond 6 to 9 months.

If the disease becomes severe, the person is hospitalized and corticosteroids are given intravenously. Initially, the person is given nothing by mouth, and intravenous fluids are given to restore and maintain body fluids (hydration). People with heavy rectal bleeding may require blood transfusions. People who have more chronic anemia may require iron supplements by mouth or intravenously.

**Immunomodulating Drugs:** Drugs such as azathioprine and mercaptopurine, which modify the actions of the immune system, are effective for people with Crohn's disease who do not respond to other drugs and are especially effective for maintaining long periods of remission. They significantly improve the person's overall condition, decrease the need for corticosteroids, and often heal fistulas. However, these drugs may not produce clinical benefits for 1 to 3 months and may have potentially serious side effects. Therefore, a doctor closely monitors the person for allergy, inflammation of the pancreas (pancreatitis), and a low white blood cell count. Newly available genetic testing that detects variations in one of the enzymes that metabolize azathioprine and mercaptopurine and blood tests that directly measure metabolite levels may sometimes help the doctor ensure safe and effective drug dosages.

**Methotrexate**, given by injection or by mouth once a week, often benefits people who do not

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respond to or who cannot tolerate corticosteroids, [azathioprine](#) , or [mercaptopurine](#) .

**Cyclosporine** in high doses may help heal fistulas, but it cannot safely be used long-term.

**Infliximab**, which is derived from monoclonal antibodies, is another modifier of the immune system's actions. [Infliximab](#) infused intravenously, can be given to treat moderate to severe Crohn's disease that has not responded to other drugs, to treat people with fistulas, and to maintain response when the disease is difficult to control. However, because the benefits of each infusion of [infliximab](#) are short-lived, other treatments are needed between infusions. Such treatments may include other immunomodulating drugs such as [azathioprine](#) , [mercaptopurine](#) , or [methotrexate](#) . Because [infliximab](#) is a relatively new drug, its long-term benefit and all of its side effects are not yet known, but it may worsen an existing uncontrolled bacterial infection, may reactivate tuberculosis, and may increase the risk of some types of cancer. Some people have reactions such as fever or rash during the infusion.

**Adalimumab** is a drug related to [infliximab](#) , which focuses on regulating the immune system. [Adalimumab](#) is particularly helpful for people who cannot tolerate or who no longer respond to [infliximab](#) .

### Drugs That Reduce Bowel Inflammation

Drug	Selected Side Effects	Comments
<b>Aminosalicylates</b>		
Sulfasalazine	Common: Nausea, headache, dizziness, fatigue, fever, rash, reversible male infertility Uncommon: Inflammation of the liver (hepatitis), pancreas (pancreatitis), or lung (pneumonitis); hemolytic anemia	Abdominal pain, dizziness, and fatigue are related to dose; hepatitis and pancreatitis are unrelated to dose
Balsalazide	Common: Fever, rash	Most side effects seen with <a href="#">sulfasalazine</a> may occur with any of the other aminosalicylates but much less frequently
Mesalamine	Uncommon: Pancreatitis, inflammation of the pericardium (pericarditis), pneumonitis	
Olsalazine	For <a href="#">olsalazine</a> : Watery diarrhea	
<b>Corticosteroids</b>		
Prednisone	Diabetes mellitus, high blood pressure, cataracts, osteoporosis, thinning of skin, mental problems, acute psychosis, mood swings, infections, acne, excessive body hair (hirsutism), menstrual irregularities, gastritis, peptic ulcer disease	Diabetes and high blood pressure are more likely to occur in people who have other risk factors
Budesonide	Diabetes mellitus, high blood pressure, cataracts, osteoporosis (decreased bone density)	Same side effects as prednisone but to a lesser degree
<b>Immunomodulators</b>		
Azathioprine	Anorexia, nausea, vomiting, infection, cancer, allergic reactions, pancreatitis, low white blood cell count, bone marrow suppression, liver dysfunction	Side effects that are usually dose dependent include bone marrow suppression and liver dysfunction Interval blood monitoring is required
Mercaptopurine		
Cyclosporine	High blood pressure, nausea, vomiting, diarrhea, kidney failure, tremors, infections, seizures, neuropathy, development of lymphomas (cancers of the lymphatic system)	Side effects become more likely with long-term use
Methotrexate	Nausea, vomiting, abdominal distress, headache, rash, soreness of the mouth, fatigue, scarring of the liver (cirrhosis),	Liver toxicity is likely dose dependent Not prescribed for pregnant women

Infliximab	low white blood cell count, infections Causes abortions and birth defects during pregnancy	Infusion reactions are potential immediate side effects that occur during the infusion such as fever, chills, hives, decreased blood pressure, or difficulty breathing Patients should be screened for tuberculosis before initiating treatment
Adalimumab	Infusion reactions, infections, cancer, abdominal pain, liver dysfunction, low white blood cell count	Side effect are similar to <input type="checkbox"/> infliximab <input type="checkbox"/> except does not cause infusion reactions Hypersensitivity reactions include rash, urticaria, pruritis, and hives

**Broad-spectrum Antibiotics:** Antibiotics that are effective against many types of bacteria are often prescribed. The antibiotic  metronidazole  is the most common choice for the treatment of abscesses and fistulas around the anus.  Metronidazole  may also help relieve the noninfectious symptoms of Crohn's disease, such as diarrhea and abdominal cramps. However, when used for a long time,  metronidazole  can damage nerves, resulting in a pins-and-needles feeling in the arms and legs. This side effect usually disappears when the drug is stopped, but relapses of Crohn's disease after discontinuing  metronidazole  are common. Some other antibiotics, such as  ciprofloxacin  or  levofloxacin  , may be used in place of or in combination with  metronidazole  .  Rifaximin  , a nonabsorbable antibiotic, is also sometimes used in treating active Crohn's disease.

**Dietary Regimens:** Defined-formula liquid diets, in which each nutritional component is precisely measured, may improve the condition of an intestinal obstruction or fistula at least for a short time. Nutritional therapy also may help children grow more than they might otherwise, especially when given at nighttime by tube feeding. These diets may be tried before or in addition to surgery. Occasionally, concentrated nutrients are given intravenously to compensate for the poor absorption of nutrients that is typical of Crohn's disease.

**Surgery:** Most people with Crohn's disease require surgery at some point during their illness. Surgery is needed when the intestine is obstructed or when abscesses or fistulas do not heal. An operation to remove diseased sections of the intestine may relieve symptoms indefinitely, but it does not cure the disease. Crohn's disease tends to recur where the remaining intestine is rejoined, although several drug therapies initiated after surgery reduce this tendency. A second operation is ultimately needed in nearly half of the people. Consequently, surgery is performed only if specific complications or the failure of drug therapy makes it necessary. Still, most people who have undergone surgery consider their quality of life to be better than it was before the operation.

Crohn's disease usually does not shorten a person's life. However, some people die of cancer of the digestive tract, which may develop in long-standing Crohn's disease.

Last full review/revision August 2006 by David B. Sachar, MD; Aaron E. Walfish, MD

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