



C. difficile infection

Symptoms and causes

By Mayo Clinic Staff

Symptoms

Some people carry the bacterium *C. difficile* in their intestines but never become sick, though they may still spread the infection. Signs and symptoms usually develop within five to 10 days after starting a course of antibiotics, but may occur as soon as the first day or up to two months later.

Mild to moderate infection

The most common symptoms of mild to moderate *C. difficile* infection are:

- Watery diarrhea three or more times a day for two or more days
- Mild abdominal cramping and tenderness

Severe infection

In severe cases, people tend to become dehydrated and may need hospitalization. *C. difficile* causes the colon to become inflamed (colitis) and sometimes may form patches of raw tissue that can bleed or produce pus (pseudomembranous colitis). Signs and symptoms of severe infection include:

- Watery diarrhea 10 to 15 times a day
- Abdominal cramping and pain, which may be severe
- Rapid heart rate
- Fever
- Blood or pus in the stool
- Nausea
- Dehydration
- Loss of appetite
- Weight loss
- Swollen abdomen
- Kidney failure

- Increased white blood cell count

When to see a doctor

Some people have loose stools during or shortly after antibiotic therapy. This may be due to *C. difficile* infection. See your doctor if you have three or more watery stools a day and symptoms lasting more than two days or if you have a new fever, severe abdominal pain or cramping, or blood in your stool.

Causes

C. difficile bacteria are found throughout the environment — in soil, air, water, human and animal feces, and food products, such as processed meats. A small number of healthy people naturally carry the bacteria in their large intestine and don't have ill effects from the infection.

C. difficile infection is most commonly associated with health care and recent antibiotic use, occurring in hospitals and other health care facilities where a much higher percentage of people carry the bacteria. However, studies show increasing rates of community-associated *C. difficile* infection, which occurs among populations traditionally not considered high risk, such as children and people without a history of antibiotic use or recent hospitalization.

Spores from *C. difficile* bacteria are passed in feces and spread to food, surfaces and objects when people who are infected don't wash their hands thoroughly. These spores can persist in a room for weeks or months. If you touch a surface contaminated with *C. difficile* spores, you may then unknowingly swallow the bacteria.

Your intestines contain about 100 trillion bacterial cells and up to 2,000 different kinds of bacteria, many of which help protect your body from infection. When you take an antibiotic to treat an infection, these drugs tend to destroy some of the normal, helpful bacteria in addition to the bacteria causing the infection. Without enough healthy bacteria to keep it in check, *C. difficile* can quickly grow out of control. The antibiotics that most often lead to *C. difficile* infections include fluoroquinolones, cephalosporins, penicillins and clindamycin.

Once established, *C. difficile* can produce toxins that attack the lining of the intestine. The toxins destroy cells and produce patches (plaques) of inflammatory cells and decaying cellular debris inside the colon and cause watery diarrhea.

Emergence of a new strain

An aggressive strain of *C. difficile* has emerged that produces far more toxins than other strains do. The new strain may be more resistant to certain medications and has shown up in people who haven't been in the hospital or taken antibiotics. This strain of *C. difficile* has caused several outbreaks of illness since 2000.

Risk factors

Although people — including children — with no known risk factors have gotten sick from *C. difficile*, certain factors increase your risk.

Taking antibiotics or other medications

Medication-associated risk factors include:

- Currently taking or having recently taken antibiotics
- Taking broad-spectrum antibiotics that target a wide range of bacteria
- Using multiple antibiotics
- Taking antibiotics for a long time
- Taking medications to reduce stomach acid, including proton pump inhibitors

Staying in a health care facility

The majority of *C. difficile* cases occur in, or after exposure to, health care settings — including hospitals, nursing homes and long-term care facilities — where germs spread easily, antibiotic use is common and people are especially vulnerable to infection. In hospitals and nursing homes, *C. difficile* spreads mainly on hands from person to person, but also on cart handles, bedrails, bedside tables, toilets, sinks, stethoscopes, thermometers — even telephones and remote controls.

Having a serious illness or medical procedure

If you have a serious illness, such as inflammatory bowel disease or colorectal cancer, or a weakened immune system as a result of a medical condition or treatment (such as chemotherapy), you're more susceptible to a *C. difficile* infection. Your risk of *C. difficile* infection is also greater if you've had abdominal surgery or a gastrointestinal procedure.

Older age is also a risk factor for *C. difficile* infection. In one study, the risk of becoming infected with *C. difficile* was 10 times greater for people age 65 and older compared with younger people.

After having a previous *C. difficile* infection, your chances of having a recurring infection can be up to 20 percent, and the risk increases further with every subsequent infection.

Complications

Complications of *C. difficile* infections include:

- **Dehydration.** Severe diarrhea can lead to a significant loss of fluids and electrolytes. This makes it difficult for your body to function normally and can cause blood pressure to drop to dangerously low levels.
- **Kidney failure.** In some cases, dehydration can occur so quickly that kidney function rapidly deteriorates (kidney failure).
- **Toxic megacolon.** In this rare condition, your colon is unable to expel gas and stool, causing it to become greatly distended (megacolon). Left untreated, your colon may rupture, causing bacteria from the colon to enter your abdominal cavity. An enlarged or ruptured colon requires emergency surgery and may be fatal.
- **A hole in your large intestine (bowel perforation).** This is rare and results from extensive damage to the lining of your large intestine or after toxic megacolon. A perforated bowel can

spill bacteria from the intestine into your abdominal cavity, leading to a life-threatening infection (peritonitis).

- **Death.** Even mild to moderate C. difficile infections can quickly progress to a fatal disease if not treated promptly.
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