



X-Plain *C. difficile* Infections Reference Summary

Introduction

C. difficile is a type of bacteria that can cause diarrhea and infection of the colon. This bacterium is more likely to infect patients at hospitals and other healthcare institutions.

It is estimated that *C. difficile* affects tens of thousands of patients in the United States every year resulting in about 5,000 deaths. Patients and healthcare providers can do a lot to prevent *C. difficile* infections.

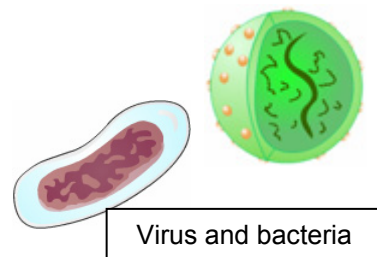
This reference summary explains what a *C. difficile* infection is. It discusses its causes, symptoms, diagnosis and treatment. It also gives tips about how to prevent a *C. difficile* infection from happening in the first place.

Background Info (Bacteria & Antibiotics)

This section reviews important terms and concepts that will help you understand *C. difficile* infections.

Germes are all around us. There are millions of them in the air and on our skin. Viruses and bacteria are examples of germes. *C. difficile* is the name of a bacterium known as Clostridium difficile. It is often abbreviated *C. diff*.

Many parts of the body specialize in fighting germes. All of the germ-fighting parts of the body together make up the immune system. Sometimes germes can get past the immune system's defenses and cause infection and inflammation.



If the immune system does not win the fight against an infection, the infection could spread to the blood and other parts of the body. If not treated, these infections could be life-threatening.

Scientists have developed antibiotics to fight bacteria. Antibiotics are not good at fighting viruses such as the flu virus. Antibiotics come in different types and strengths.

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Some antibiotics kill some bacteria but not others. Sometimes antibiotics kill bacteria that compete with *C. diff* in the colon, but do not kill *C. difficile*. This makes it easier for *C. diff* to grow.

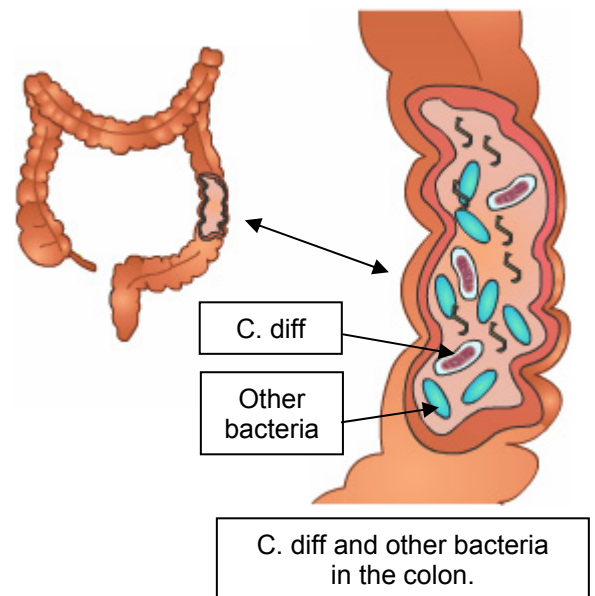
Viruses and bacteria keep changing their structure through a process called mutation. Scientists call these new mutated germs “strains”. New strains of germs can become more resistant to antibiotics. If the new strains are more resistant to antibiotics, they become difficult to fight and more dangerous. However, we may give longer courses of the treatments or combinations of antibiotics for the newer *C. diff* strains.

C. diff Infections

C. diff is a very common bacterium. Its spores can be found in the earth, feces of animals and humans. Spores are the dormant form of the bacterium, and they can live on the surfaces of objects for a long time.

The majority of people get the *C. diff* spores when they fail to wash their hands before eating. The acidity of the stomach destroys many of the spores. If any reach the intestines, they are controlled by the immune system. However, the immune system may not kill all the tough *C. diff* spores. Some of them remain dormant.

The intestines have hundreds of bacteria, many of which have useful functions, such as helping to stimulate the immune system and produce vitamins. When *C. diff* spores exist in the colon, the other bacteria do not allow them to grow and thrive.



Some antibiotics kill the bacteria that *C. diff* competes with. This makes it easier for *C. diff* to grow. Exposure to almost any antibiotic can put one at risk for *C. diff*. When it grows, *C. diff* secretes poisonous substances known as toxins. These toxins spread in the digestive system and cause the formation of tissues that look like membranes. They are called pseudomembranes or false membranes. This is why *C. diff* infections are also called pseudomembranous colitis.

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If people become sick and their immune system is weakened, it becomes easier for *C. diff* infections to spread. That is why *C. diff* is common in hospitals and nursing homes where many patients and residents are weak from sickness or surgery.

Other medications used at hospitals can also make it easier for *C. diff* to grow. This includes chemotherapy medications, antiviral and antifungal medications. The longer these kinds of medications or antibiotics are used, the more likely it is for *C. diff* to grow and cause a serious infection. Chemotherapy is the use of powerful drugs to kill cancerous cells.



Patients at hospitals and other healthcare facilities are much more likely to get *C. diff* infections than healthy people because they are more likely to be on antibiotics and their immune system is more likely to be weak.

Complications

C. diff can be treated with certain antibiotics and most people do not develop the serious complications. This section discusses the serious complications that can develop if *C. diff* is not treated.

C. diff infections cause diarrhea. Severe diarrhea can cause you to lose fluids and important salts. This is known as dehydration. Dehydration can cause your blood pressure to become very low.

Severe inflammation of the colon, or colitis, can cause a hole in the bowel. If a hole forms in the bowel, the bacteria will spill into the abdominal cavity and cause an infection. This is known as peritonitis.

Symptoms

Some people who carry the *C. diff* spores in their intestines never become sick. For others, *C. diff* grows in the intestines causing attacks of watery diarrhea, which often comes with nausea, and cramping abdominal pain.



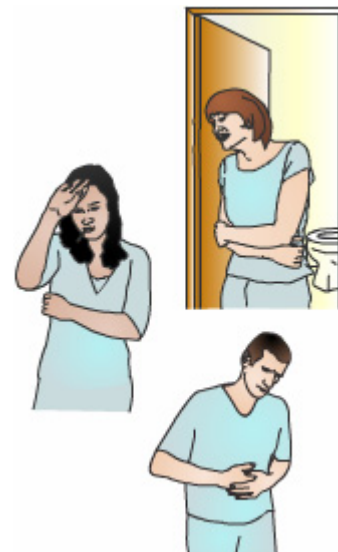
If you are at the hospital or a healthcare facility and you develop diarrhea, tell your healthcare provider immediately. Most people develop *C. diff* shortly after they take antibiotics. However, symptoms can start weeks after completing antibiotic therapy.

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More and more people who become infected with *C. diff* develop severe inflammation of the colon, or colitis. This is a serious condition that can lead to serious complications such as perforation or rupture of the colon, which can be life-threatening if not treated right away.

Signs of colitis caused by *C. diff* include:

- watery diarrhea
- at least three bowel movements per day for two or more days
- fever
- loss of appetite
- nausea
- abdominal pain
- weight loss
- blood or pus in the stool



If you are outside the hospital, you should see your doctor if:

- you have diarrhea and nausea that lasts more than three days
- you have severe abdominal pain, blood or pus in your stool, or more than three bowel movements per day
- you have a fever, are feeling weak, or you faint

Diagnosis

Doctors suspect that a patient has *C. diff* if he or she has diarrhea and has taken antibiotics in the past two months. They also suspect it in patients who immediately develop diarrhea after hospitalization.

Doctors conduct a thorough test to determine if there are no other reasons for the diarrhea and other symptoms. They then test the patient's stool to check if it has toxins from *C. difficile*. If needed, they can look at the colon with an endoscope or order a CT scan.

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Treatment

To treat *C. difficile*, the doctor may first try to stop the antibiotics that may have triggered them. For some patients stopping antibiotics is not an option.

Many times stopping the antibiotics is either not an option or does not work. In these cases, special antibiotics are needed to treat *C. diff*. These include metronidazole and or vancomycin. They are given by mouth to kill the active *C. diff*. Unfortunately, they may not kill the tough spores of *C. diff*, which can remain dormant and may cause repeated infections later. If repeated infections occur, they are treated again with special antibiotics. Some doctors prescribe probiotics, which are dietary supplements that have also been shown to help with the treatment of *C. diff*.

For patients that have severe complications, such as perforated colon or ruptured colon, surgery may be needed. Dialysis may be needed for patients with kidney failure.



Prevention

At the hospital, to protect yourself and your visitors from *C. diff*, wash your hands often and ask hospital staff if they have washed their hands before touching you. To avoid spreading infections to themselves and others, healthcare staff should:

- Disinfect hospital surfaces. Standard hospital disinfectants are not as effective against *C. diff*, therefore, a bleach solution may be used.
- Wash their hands before and after treating each patient or touching surfaces that may be contaminated. Soap and water are better than an alcohol hand sanitizer for *C. diff*.



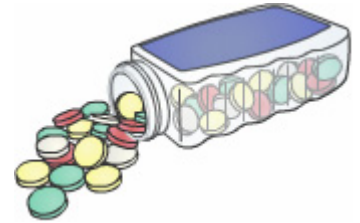
Healthcare staff should place patients with *C. diff* in a private room when possible. Special Precautions called “Isolation” are used for *C. diff* and undiagnosed diarrhea. An “Isolation Sign” should be placed on the door. Staff and visitors should put on a gown and gloves before entering the room. Gowns and gloves should be removed and their hands washed with soap and water before leaving the room.

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Outside the hospital, you can reduce your risk of getting *C. diff* spores by following these 4 guidelines.

First, wash your hands well and often, using warm water and soap for 15 seconds particularly after you go to the bathroom and before you eat.

Second, avoid taking antacids unless you really need them. The acids of the stomach kill many *C. diff* bacteria before they reach the colon. Restricting these acids with medication may allow more *C. diff* to go through to the intestines.



Third, you can help prevent *C. diff* by taking antibiotics only when necessary and prescribed by the doctor. Over usage of antibiotics make them less effective in treating bacterial infections.

Fourth, clean home environment surfaces, especially in the bathroom with a bleach solution (1 part unscented chlorine bleach to 9 parts of tap water) made fresh daily. Use friction when cleaning and allow the surfaces to air dry.

Conclusion

C. diff is a type of bacteria that can cause diarrhea and infection of the colon. This bacterium is more likely to infect patients at hospitals and other healthcare institutions and infect patients who are or have taken antibiotics recently.

While at the hospital, you should be extra careful to avoid getting infected. To protect yourself wash your hands often and ask hospital staff if they have washed their hands before touching you.

To avoid spreading infection to themselves and others, healthcare staff should:

- Disinfect hospital surfaces with a bleach solution.
- Wash their hands with soap and water before and after treating each patient or touching surfaces that may be contaminated.
- Place patients with *C. diff* in a private room when possible.
- Wear disposable gown and gloves when treating people with *C. diff* infections.



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If you develop diarrhea while at the hospital, tell your doctor or nurse immediately. When you are outside the hospital, you should see your doctor if your diarrhea and nausea last more than three days or if you have severe pain or cramping, blood or pus in your stool, or more than three bowel movements per day.

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