

# *Clostridium difficile* Infection, *Clostridium difficile* Colitis or *Clostridium difficile*-associated Diarrhea

*(C. diff)* (Kloss-trid-ee-um DIFF-iss-il)

*Clostridium difficile* (also known as *C. diff*) is a bacterium that can be part of the normal bacteria living in the intestines and most of the time does not cause any problems.

## *What causes C. difficile colitis?*

If the balance of bacteria in the intestines is altered, such as in antibiotic use, *C. difficile* infection may develop and lead to colitis (inflammation in the colon). The colitis is caused by the production of two toxins that can lead to irritation in the colon. *C. difficile* can spread from person to person or through contact with objects contaminated with feces (fecal-oral transmission).

## *How common is C. difficile and who is at risk of developing it?*

The incidence of *C. difficile* infections in children is on the rise. It is estimated that approximately 3-6% of children greater than 1 year of age may have *C. difficile*. These infections account for as many as 2-4 per 1000 hospital admissions for children.

The most common risk factor for *C. difficile* infections is antibiotic use. Other risk factors include use of antacid medications (especially proton pump inhibitors), repeated use of enemas and prolonged use of feeding tubes. Children with bowel disease such as inflammatory bowel disease and those who undergo gastrointestinal surgery are also at an increased risk for infection. Children with a weakened immune system as well as children who have been hospitalized may also develop *C. difficile* infection more commonly.

## *What are the signs and symptoms of C. difficile?*

1. Asymptomatic: some individuals may not have any symptoms. This is especially true in infants where up to 1/3 may be carriers of the bacteria. If someone has the bacteria in their intestines, they are considered to be colonized with *C. difficile*.
2. Diarrhea: *C. difficile* can cause inflammation in the colon known as colitis that may lead to diarrhea that frequently contains blood.
3. Abdominal pain
4. Fever
5. Loss of appetite and weight loss

## *How is C. difficile diagnosed?*

A *C. difficile* infection is suggested when a child presents with a combination of fever, abdominal pain, and bloody diarrhea. A review of the child's current and recent medications may reveal recent use of antibiotics or long-term use of proton pump inhibitor (antacid) therapy.

A stool test is needed to confirm the diagnosis.



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## What tests are used in children to diagnose *C. difficile*?

In the presence of diarrhea, *C. difficile* infection is confirmed by evaluating the stool for the presence of *C. difficile* toxins or the genes that produce the toxins. Testing for *C. difficile* is not routinely done in infants less than one year of age as this group is more likely to be colonized with *C. difficile* without having an infection.

Sometimes a colonoscopy may be done to evaluate the diarrhea. The presence of a particular finding called pseudomembranes and an inflamed colonic mucosa (lining of the colon) suggests the diagnosis of *C. difficile* colitis.

## What is the treatment for *C. difficile* Infection?

In most instances, antibiotic medications are used to treat *C. difficile* infections. Currently, oral metronidazole is the first-line of therapy though oral vancomycin is often used. Intravenous antibiotics may be used as well for children with severe disease or who are not able to tolerate oral medications. Children also should drink plenty of fluids to avoid dehydration.

If children develop *C. difficile* infection while on antibiotic therapy for another illness, these medications should be stopped, if possible. Use of anti-diarrheal medications such as loperamide should be avoided as well.

Fecal transplantation (stool from a donor placed in the colon of someone with *C. difficile* infection with a colonoscope) is currently being studied as a possible treatment for those individuals who are not responsive to routine antibiotic therapy.

## What can I expect if my child has *C. difficile*?

The majority of children with *C. difficile* infections respond well to antibiotic therapy. However, as many as 30% of children may develop *C. difficile* again. In these instances, another course of the same antibiotic, changing to a new antibiotic, or increasing the duration of antibiotic therapy may be helpful.

## Can *C. difficile* infection be prevented?

*C. difficile* can form spores, which can live a long time and can spread fecal-orally. Adequate hand washing is important to prevent the spread of the disease. Hand washing with soap and water is more effective than with alcohol hand cleaner. Proper cleaning of contaminated areas is important to prevent the spread. Since *C. difficile* is associated with antibiotic use, limiting the use of antibiotics may also be helpful.

In addition, breastfeeding has been shown to decrease colonization with *C. difficile*.

## Quick Facts

- *C. difficile* infection presents with fever, abdominal pain, and diarrhea (frequently with blood).
- The incidence of *C. difficile* in children is estimated to be 3-6%.
- Risk factors include hospitalization, use of antibiotics and antacid therapy and history of intestinal disorders such as inflammatory bowel disease.
- Diagnosis is based on symptoms of diarrhea and the presence of toxins in the child's stool.
- Treatment is based on antibiotic therapy though there is a high recurrence rate.
- Hand washing with soap and water is important to prevent transmission of the disease.

### IMPORTANT REMINDER:

This information from the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) is intended only to provide general information and not as a definitive basis for diagnosis or treatment in any particular case. It is very important that you consult your doctor about your specific condition.

November 2013



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