

Treating and Preventing *C. difficile* Infections

A Review of the Research for Adults



Is This Information Right for Me?

This information is right for you if:

- Your health care professional has said that you or someone you care for has a *Clostridium difficile* (said klos-TRID-e-uhm dif-uh-SEEL) infection (CDI). CDI causes watery diarrhea and cramping in your belly. *Clostridium difficile* is also often called “*C. difficile*” or “*C. diff.*”
- You are age 18 or older. This information is from research on adults.

What will this summary tell me?

This summary will answer these questions:

- What is a *C. difficile* infection?
- How is CDI treated?
 - » What have researchers found about treatments for CDI?
 - » What are possible side effects of treatments for CDI?
- What can I do to help prevent CDI?
- What should I think about when deciding on treatment for my CDI?

What is the source of this information?

This information comes from a research report that was funded by the Agency for Healthcare Research and Quality, a Federal Government agency.

To write the report, researchers looked at 56 scientific research articles reporting on studies to prevent and treat CDI. The studies were published through April 2015.

Health care professionals, researchers, experts, and the public gave feedback on the report before it was published. You can read the full report at www.effectivehealthcare.ahrq.gov/c-difficile-update-report/.



Understanding Your Condition

What is a *C. difficile* infection?

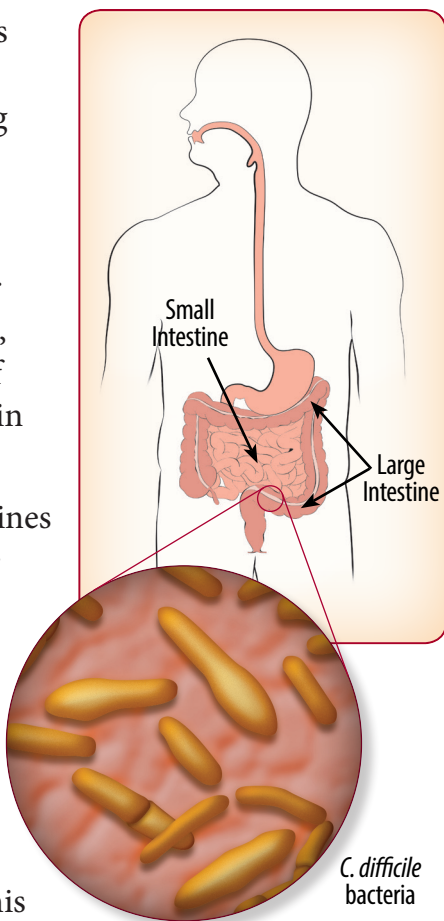
A *C. difficile* infection (CDI) results from a type of bacteria (or germ) called *Clostridium difficile* infecting your large intestine. *C. difficile* bacteria are common and can be found everywhere. These bacteria can be found in the air, in water, or on items such as door knobs, sinks, and countertops. Small amounts of *C. difficile* bacteria are even found in many people's intestines.

If *C. difficile* bacteria in your intestines grow out of control, they can cause an infection. This can happen after a person takes antibiotics.

Antibiotics are a type of medicine that fight infections caused by bacteria. When you take antibiotics, the normal bacteria in your intestines that help keep you healthy can also be killed. When this happens, bacteria such as *C. difficile*

can grow out of control. When a person has CDI, chemicals called toxins produced by the *C. difficile* bacteria make him or her sick.

CDI affects about 500,000 people in the United States each year. CDI can be mild to severe. The most common symptoms of CDI include watery diarrhea (three or more times a day for 2 or more days) and cramping in your belly. Some people with CDI can become very sick. In rare cases, severe CDI can be life threatening.



Symptoms of severe CDI may include:

- Having watery diarrhea often (as many as 15 times) throughout the day and night
- Cramping and pain in your belly that may be severe
- Blood or pus (a thick, yellowish substance) in your bowel movements
- Tenderness in your belly
- A swollen belly
- A fever
- Nausea
- Vomiting
- Not enough water in your body (called “dehydration”)
- Loss of appetite
- Weight loss

What increases the risk of CDI?

Anyone can get CDI, but some people have a higher risk. You may be at a higher risk for getting CDI if you:

- Have taken antibiotics in the past 30 days.
- Have a weak immune system from an ongoing illness.
- Have been in the hospital or a long-term care facility.
- Are age 65 or older.
- Have inflammatory bowel disease.
- Have had CDI one or more times in the past.
- Take a medicine to lower the amount of acid in your stomach, such as Prevacid®, Tagamet®, Prilosec®, or Nexium®. These medicines are called proton pump inhibitors or PPIs.

Can CDI come back after treatment?

For some people, CDI may return after treatment ends. Out of every 10 people who have had CDI in the past, as many as 3 to 6 people will have CDI again.

Things you can do to help prevent CDI are discussed on page 8 of this summary.

Understanding Your Options

How is CDI treated?

There are several treatments for CDI, including:

- **Antibiotics** to treat your CDI.
- **Probiotics** to take with an antibiotic to help keep your CDI from coming back.
- **Fecal microbiota transplantation** if antibiotics do not help your CDI or if your CDI keeps coming back.

These treatments are discussed in more detail in the pages that follow.

What about antidiarrhea medicines?

Talk with your health care professional before taking any over-the-counter antidiarrhea medicines (such as Pepto-Bismol®, Kaopectate®, or Imodium®) for your CDI. These medicines may make CDI worse.



Antibiotics

If your CDI happened after you took an antibiotic, your health care professional may have you stop taking the antibiotic. Your health care professional will likely give you a different antibiotic to help treat your CDI. The antibiotic your doctor recommends may depend on the availability and cost of the antibiotic, what is covered by your health insurance plan, and how severe your CDI is.

Note: You should never stop taking any medicine without first talking with your health care professional.

Your health care professional will likely first recommend one of these antibiotics:

- Metronidazole (Flagyl®)
- Vancomycin (Vancocin®)

If metronidazole (Flagyl®) and vancomycin (Vancocin®) do not work to treat your CDI, your health care professional may recommend a newer kind of antibiotic:

- Fidaxomicin (Difcid®)
 - » Fidaxomicin is much more expensive than both metronidazole and vancomycin. The cost to you depends on your health insurance plan.
 - » Most health insurance plans will only cover fidaxomicin after you have tried metronidazole and vancomycin and neither one worked.

What did researchers find about antibiotics for CDI?

Antibiotic	What did researchers find?
Metronidazole (Flagyl®)	<ul style="list-style-type: none">■ Works to treat CDI for most people.■ CDI is just as likely to come back with metronidazole (Flagyl®) as it is with taking vancomycin (Vancocin®).
Vancomycin (Vancocin®)	<ul style="list-style-type: none">■ Works to treat CDI for most people.■ Works slightly better than metronidazole (Flagyl®).■ CDI is just as likely to come back with vancomycin (Vancocin®) as it is with taking metronidazole (Flagyl®).
Fidaxomicin (Dificid®)	<ul style="list-style-type: none">■ Works as well as vancomycin (Vancocin®) does.■ CDI is less likely to come back with fidaxomicin (Dificid®) than after taking vancomycin (Vancocin®).

What are possible side effects of antibiotics to treat CDI?

The U.S. Food and Drug Administration (FDA) lists the following possible side effects of antibiotics to treat CDI. Just because a side effect is possible does not mean you will have it.

Antibiotic	Possible Side Effects
Metronidazole (Flagyl®)	<div><div><ul style="list-style-type: none">■ Nausea■ Vomiting■ Headache■ Loss of appetite</div><div><ul style="list-style-type: none">■ Diarrhea■ Pain in the belly■ Constipation■ Metallic taste in the mouth</div></div> <p>Warning: Metronidazole (Flagyl®) may cause nerve damage and seizures, although these are rare.</p>
Vancomycin (Vancocin®)	<ul style="list-style-type: none">■ Nausea■ Pain in the belly■ Low potassium in the blood
Fidaxomicin (Dificid®)	<div><div><ul style="list-style-type: none">■ Nausea■ Vomiting■ Pain in the belly■ Low red blood cell count (anemia)</div><div><ul style="list-style-type: none">■ Low white blood cell count (neutropenia)■ Bleeding in the stomach</div></div>

Probiotics

To help keep your CDI from coming back, your health care professional may suggest that you take probiotics along with the antibiotic to treat your CDI. Probiotics are healthy bacteria and other microscopic organisms that are normally found in your body. Probiotics are taken as dietary supplements. They come in some foods, such as yogurt, kefir (a drink made from fermented milk), soy drinks, buttermilk, some soft cheeses, and enriched milk. Probiotics also come as a pill you can take by mouth.

Note: The FDA approves the quality and safety of all prescription and over-the-counter medicines. But dietary supplements such as probiotics do not need FDA approval. When considering a dietary supplement, always check the label to see if the supplement has been tested for quality.

What did researchers find about probiotics?

The chart below lists some different types of probiotics and what researchers found about each.

Types of Probiotics	What did researchers find?
<i>Saccharomyces boulardii</i> (also called <i>S. boulardii</i>)	■ Does not appear to help keep CDI from coming back when added to treatment with an antibiotic, but more research is needed to know this for sure.
Lactobacillus	■ Appears to help keep CDI from coming back when added to treatment with an antibiotic, but more research is needed to know this for sure.
A combination of two or more types of probiotics	

What are possible side effects of probiotics?

Probiotics are usually safe for people who are generally healthy. Possible side effects of probiotics may include gas and bloating. For people with a weak immune system, *S. boulardii* may cause severe side effects, such as a life-threatening fungal infection. It is important to always talk with your health care professional before taking probiotics.

Fecal Microbiota Transplantation

Fecal microbiota transplantation (FMT) is a newer type of treatment for CDI. Your health care professional may suggest FMT if antibiotics do not help your CDI or if your CDI keeps coming back. FMT is meant to help put some of the “good” bacteria back into your intestines. To do this, your health care professional takes a small amount of stool containing healthy bacteria from a person who does not have CDI and places it into your intestine. The stool may come from a close family member or from a healthy donor from a stool bank.

What did researchers find about FMT?

Researchers found that FMT appears to help stop diarrhea and to help keep CDI from coming back, but more research is needed to know this for sure.

What are possible side effects of FMT?

There is not much research on the short-term and long-term side effects of FMT. There is a chance of bleeding or infection, but the risk is low.

Other possible side effects of FMT may include:

- Diarrhea
- Stomach cramps
- Nausea
- Belching
- Constipation

What can I do to help prevent CDI?

- Only take antibiotics when your health care professional prescribes them. Take all antibiotics exactly as instructed. Never stop taking an antibiotic without first talking with your health care professional (even if you start to feel better).
- When caring for someone with CDI:
 - » Wash your hands often. To help prevent CDI, it is best to use soap and water instead of hand sanitizer.
 - » Clean often-touched surfaces such as door knobs, sinks, and countertops with a disinfectant, such as bleach.

Making a Decision

What should I think about when deciding on treatment for my CDI?

You and your health care professional can decide what might be best to treat CDI and help keep it from coming back. Talk with your health care professional about whether this is your first time to have CDI or whether you have had CDI in the past and it has come back.

Ask your health care professional

- If my CDI happened after taking an antibiotic, should I stop taking the antibiotic? Is there a different antibiotic I can take with less risk of causing CDI?
- Which other antibiotic might be best to help treat my CDI?
- What possible side effects of the antibiotic for CDI should I watch for?
- Might probiotics help keep my CDI from coming back?
- If antibiotics do not work or if my CDI keeps coming back, might FMT help?
- What possible side effects from FMT would I need to watch for?

Notes:

Source

The information in this summary comes from the report *Early Diagnosis, Prevention, and Treatment of Clostridium difficile: Update*, March 2016. The report was produced by the Minnesota Evidence-based Practice Center through funding by the Agency for Healthcare Research and Quality (AHRQ). It is an update of a 2011 report, *Effectiveness of Early Diagnosis, Prevention, and Treatment of Clostridium difficile Infection*, also produced by the Minnesota Evidence-based Practice Center.

For a copy of the 2016 report or for more information about AHRQ, go to www.effectivehealthcare.ahrq.gov/c-difficile-update-report/.

Additional information came from the MedlinePlus® Web site, a service of the National Library of Medicine and the National Institutes of Health. This site is available at www.medlineplus.gov.

This summary was prepared by the John M. Eisenberg Center for Clinical Decisions and Communications Science at Baylor College of Medicine, Houston, TX. People who have had CDI gave feedback on this summary.

