



Patient Education: *Clostridioides difficile* Infection

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What Is *C. difficile* Infection?

C. difficile infection or *Clostridioides difficile* (formerly known as *Clostridium difficile*) infection also referred to as “C. diff” is a bacterial infection of the colon (large intestine) that infects millions of adults and children worldwide every year.¹ *Clostridioides difficile* is a bacterium that can be found throughout the environment and its spore form can be very difficult to clean and eradicate on surfaces. This infection is typically spread when people accidentally touch areas contaminated by the spores of this bacterium and unknowingly ingest these spores. Upon exposure to these bacteria, patients with risk factors get infected as the bacterial spores germinate and produce toxins that lead to the symptoms of *C. difficile* infection (► Fig 1).

Who Is at Risk of Getting *C. difficile* Infection?

The *C. difficile* bacterium has been known to infect humans since the late 1970s. In the past, this infection was predominantly seen in hospitalized older adults with chronic medical conditions who had received antibiotics. While older age, presence of medical conditions, hospitalization, recent medical procedures, or the use of antibiotics remains the most common risk factors, this infection is now seen in younger adults and even in children. Commonly, younger people with this infection have been exposed to antibiotics or have health conditions such as underlying inflammatory bowel diseases (ulcerative colitis or Crohn’s disease of the colon). These risk factors lead to a decrease in the number and variety of healthy bacteria in the large intestine, which in turn predisposes a person to acquisition of this infection. Rarely, people may develop this infection despite absence of these risk factors.

What Are the Symptoms and Signs of *C. difficile* Infection?

Typical symptoms and signs of *C. difficile* infection include unformed stools (that is watery stool or stool that take the shape of a container that they are placed in), abdominal pain and in some instances dehydration, fever, nausea, or loss of appetite. In rare instances, *C. difficile* infection may also cause severe inflammation of the intestine, leading to enlargement of the colon necessitating hospitalization to the intensive care and perhaps surgery to remove the colon.

How Is *C. difficile* Infection Diagnosed?

Testing a stool sample in a microbiology laboratory is needed to diagnose *C. difficile* infection. The stool tests for *C. difficile* are either designed to detect the presence of the *C. difficile* organism or the toxin produced by the bacteria.² It is recommended that patients with symptoms be tested for *C. difficile* and this test be not performed in patients without symptoms due to the risk of a falsely abnormal test. Given this risk of a falsely abnormal test, following the resolution of symptoms of *C. difficile* infection, a test of cure should never be performed.

How Is *C. difficile* Infection Treated?

The first step in the management is to assess patient’s hydration status and presence of complications and decrease modifiable risk factors such as stopping antibiotics that may not be needed. An initial episode is treated with an antibiotic by mouth such as vancomycin or fidaxomicin for 10 days, with fidaxomicin being associated with fewer recurrences.³ Oral metronidazole is no longer recommended except where vancomycin or fidaxomicin may not be available. Most

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patients improve within 3 to 5 days of initiation of antibiotics. In rare instances, surgery may be needed for patients admitted to the intensive care unit with this infection.

Approximately, 15 to 25% of patients with a first time *C. difficile* infection can develop another episode also known

as a recurrence. The risk factors for recurrences include older age, antibiotics, other health conditions (such as cancer diagnoses, heart failure, kidney disease, amongst others), severe *C. difficile* infection, and being immunosuppressed. In patients who are at a high risk of recurrence, a one-time dose

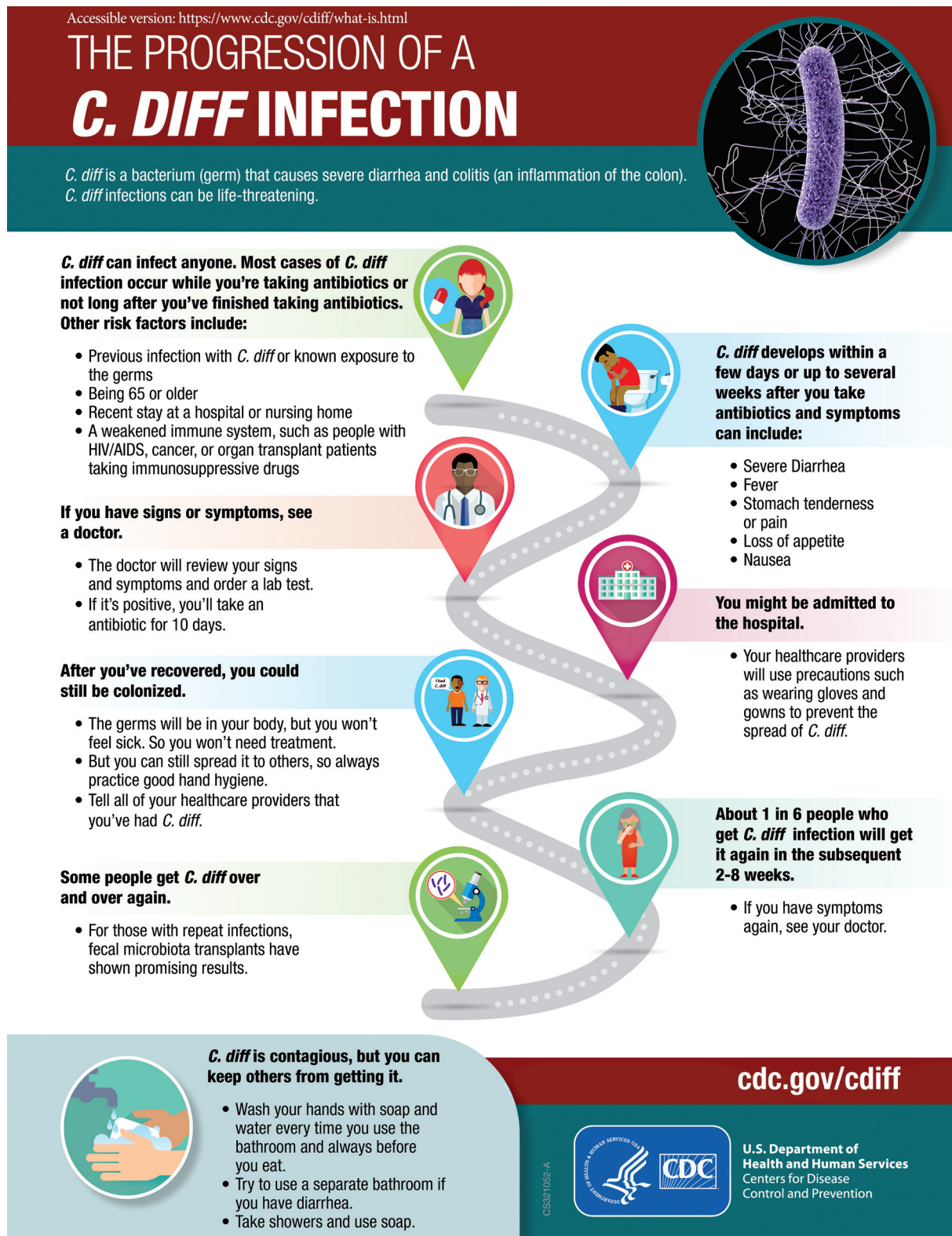


Fig. 1 The progression of *Clostridium difficile* infection (available for public use at no charge by the United States Centers for Disease Control and Prevention at <https://www.cdc.gov/cdiff/pdf/Cdiff-progression-H.pdf>, Accessed on February 18, 2022).

of intravenous bezlotoxumab, which is a monoclonal antibody against one of the *C. difficile* toxins (toxin-B), may be used to prevent recurrences.

Treatment of a recurrent *C. difficile* infection includes an antibiotic such as vancomycin or fidaxomicin (sometimes with prolonged courses) with guidelines suggesting not to repeat the same antibiotic regimen used for an initial episode. Patients with three or more infections are managed initially with an antibiotic (such as vancomycin or fidaxomicin) and then a modality to restore the balance of gut bacteria such as fecal microbiota transplantation is used. Most patients who get recurrent infections have a resolution of recurrences following this restoration of balance of gut bacteria.³

Is There a Way to Prevent the Occurrence of *C. difficile* Infection?

Avoiding exposure to risk factors that predispose one to get *C. difficile* infection is the cornerstone to prevent an episode *C. difficile* infection. The risk factors include exposure to antibiotics and exposure to patients infected with *C. difficile* infection. Prior to considering an antibiotic for any infection, it should be ascertained if the infection is bacterial or not. If a bacterial infection is confirmed or highly suspected, then an indicated antibiotic should be prescribed. One should use a narrow spectrum antibiotic for the shortest possible duration of time. An indicated antibiotic for a bacterial infection should not be withheld for apprehension of *C. difficile* infection. Antibiotic use for infection prophylaxis should be discussed and considered on an individual basis.

Is There a Way to Prevent the Spread of *C. difficile* Infection?

Preventive measures to reduce spread of *C. difficile* infection include hand washing, following contact precautions, and thorough cleaning measures. Patients with active diarrhea due to *C. difficile* infection may spread the infection to another person. In the outpatient settings, patients should be advised to use a dedicated/separate bathroom if possible. High-touch surfaces should be cleaned with a bleach-based solution. Health care and long-term care facilities follow infection-control guidelines to help prevent the spread of this infection. Health-care workers should practice strict hand hygiene (preferably with soap and water) before and after treating a person. People hospitalized with this infec-

tion should have a private room and hospital staff should wear disposable gloves and isolation gowns while in the room.⁴

What Research Is Going on in the Field of *C. difficile* Infection?

There is tremendous and exciting research in this field. There are newer antibiotics being developed for the management of initial *C. difficile* infection. Fecal microbiota transplantation remains an experimental option to prevent recurrent *C. difficile* infection. Standardized human bacteria derived treatments are being developed to alleviate recurrent infections.^{3,4}

Ethical Statement

Not applicable.

Author Contributions

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Data Availability Statement

There are no associated data.

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Conflict of Interest

None declared.

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References

- 1 Khanna S. My treatment approach to Clostridioides difficile infection. *Mayo Clin Proc* 2021;96(08):2192–2204
- 2 Gupta A, Khanna S. Repeat Clostridium difficile testing. *JAMA* 2016;316(22):2422–2423
- 3 Kelly CR, Fischer M, Allegretti JR, et al. ACG clinical guidelines: prevention, diagnosis, and treatment of Clostridioides difficile infections. *Am J Gastroenterol* 2021;116(06):1124–1147
- 4 McDonald LC, Gerding DN, Johnson S, et al. Clinical practice guidelines for Clostridium difficile infection in adults and children: 2017 Update by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA). *Clin Infect Dis* 2018;66(07):e1–e48