

Changes in Treatment and Prevention Strategies for *Clostridium difficile*

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A 2008 review of *Clostridium difficile* colitis proclaimed, "the epidemiology of *C. difficile* has changed dramatically" since 2000 when regional outbreaks occurred involving more severe and refractory disease.¹ In the United States, mortality rates for *Clostridium difficile* associated disease (CDAD) increased from 5.7 per million to 23.7 million from 1999 to 2004 based on death certificate data. Furthermore, hypervirulent epidemic strains of *C. difficile* have been associated with outbreaks in US, Quebec, UK, and other parts of Europe. Toxin production is substantially higher in vitro with these newer strains: 16-fold higher concentration of toxin A, 23-fold higher concentration of toxin B. An additional toxin has been identified that may be associated with more severe diarrhea. High level fluoroquinolone resistance has also been noted.¹

Risk factors for *C. difficile* colonization and disease include patient age, comorbidities, length of hospital stay, antibiotic use, and concomitant medications.¹⁻² (See Table 1.)

Table 1. Risk Factors for colonization, CDAD, or Severe CDAD²

Risk factors for **colonization or CDAD** include the following:

- Serum albumin < 3 g/dL
- Less than 1 year since admission to long-term care facility
- Use of proton-pump inhibitors
- Use of histamine-2 receptor antagonists
- Administration of three or more antibiotics
- Fluoroquinolone use
- Cephalosporin use
- Female sex
- Prior renal failure
- Hospital admission within three months of diagnosis

Risk factors for **increased severity of CDAD** include the following:

- Increased heart rate
- Greater than 30% bands
- Decline in respiratory status requiring mechanical intubation
- Immunosuppression
- Prior bowel surgery unrelated to prior CDAD occurrence
- Oliguria
- Hypotension requiring vasopressor therapy

As new *C. difficile* strains have emerged, treatment strategies have been revised to address the new severity of disease. In the past, metronidazole was the preferred first-line therapy to prevent production of vancomycin resistant organisms. However, the virulence of the new strains of *C. difficile* is linked to increased incidences of colectomies and death. For this reason, vancomycin is being used as a first-line agent in many cases.¹⁻² Current treatment recommendations are provided in Table 2.

Table 2. Treatment Recommendations¹

Mild to Moderate Disease	
Mild to moderate diarrhea Leukocytosis <15,000/ μ l	Metronidazole 500 mg orally three times per day for 10 to 14 days
Severe Disease	
Fever Profuse diarrhea Abdominal pain Leukocytosis \geq 15,000/ μ l Elevated creatinine	Vancomycin 125 to 500 mg orally four times per day for 10 to 14 days
Severe Disease, Complicated	
Hypotension Shock Toxic megacolon Ileus	Vancomycin 500 mg enterally by nasogastric tube and/or rectal enema four times per day with or without intravenous metronidazole 500 mg every eight hours

CDAD Prevention

A history of antibiotic use is associated with a large number of CDAD cases; therefore, caregivers across all patient-care settings are encouraged to administer antibiotics only when absolutely necessary.³ In the hospital setting alone, Cochrane database reviewers conclude that up to 50% of antibiotic usage may not be warranted.⁴ Caregivers need to recognize which individuals are at risk for CDAD and ensure that prescribed medications follow the current "best practices" guidelines for specific drug indicated, dosage, and duration of use.⁵

Prevention of Cross-Contamination

While CDAD clinical presentations vary in severity, most patients experience diarrhea. Even if CDAD is only suspected, caregivers should follow Centers for Disease Control and

Prevention (CDC) guidelines to prevent cross-contamination:⁶⁻⁷

1. Require Contact Precautions (gown and gloves) when working with the patient. Maintain strict compliance by all caregivers and ancillary personnel. Instruct and monitor family and visitors to ensure compliance;
2. Use an isolation room or assign by cohorting (rooming with another who has difficile-associated disease);
3. Observe strict handwashing pre and post patient contact and glove removal and use a paper towel to turn off faucet; and
4. Conduct adequate scrubbing of contact surfaces and reusable devices in the room. It is especially important to scrub daily any surfaces that may be contaminated with feces and frequently touched areas such as doorknobs, light switches, call lights, telephone, and television controls.

Staff should group care-giving procedures to minimize frequency of contact isolation gowning and gloving and to spend time in the room of the patient to allay isolation fears and depression.

Special Environmental Considerations

The ability of *C. difficile* to remain viable in spore form for several months makes it a special challenge to eradicate. Washing hands with common alcohol based cleaners is inadequate; washing with an antimicrobial soap for a minimum of 15 seconds is required.⁷ Transmission occurs through caregiver hands and through inadequately cleaned stethoscopes, handrails, bedpans, and toilet seats. The CDC recommends cleaning surfaces with an EPA-registered hypochlorite-based disinfectant or appropriately diluted household chlorine bleach. Alcohol-based disinfectants are not effective⁶ and milder, "green products", (those that are marketed to the public as "good for the environment") cannot kill the *C. difficile* spores.

Guidelines support using dedicated equipment whenever possible, and research studies support using disposable rectal, not electronic, thermometers.⁸ Manufacturer's guidelines are to be followed in cleaning reusable equipment. Following patient discharge, the room needs to be thoroughly cleaned including the metal bed frame.

If the discharged patient develops diarrhea at home, he or she should be instructed to notify the caregiver so a follow-up can be done. While healthy family members are unlikely to contract CDAD, bacteria can be spread to others through the oral-fecal route.⁵ This spread is preventable by washing hands with soap and water after using the bathroom and before eating and by cleaning kitchen countertops, bathroom toilets, flush handle, and sink faucet daily with 1 part bleach to 10 parts water. Patients should also be instructed to avoid use of the same toilet as family members unless a bleach solution is used after each use.⁹

Caregiver Quiz:

- A. Can a person be infected with *C. difficile* and not become sick but still spread the infection ?
- B. If a person develops *C. difficile* infection during or shortly after a course of antibiotics, do signs and symptoms always appear within 4 weeks after stopping antibiotic treatment ?
- C. Can a person become reinfected with *C. difficile*?

Answers:

- A. Yes.
- B. No, signs and symptoms may not appear for months after stopping treatment.
- C. Yes, in long term care facilities, residents may have chronic infections.

References

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