**Prevention and Management of Clostridium difficile Infection (CDI)**

*C. difficile* is a spore-forming, gram-positive, anaerobic bacillus that produces toxins. *C. difficile* accounts for up to 25% of episodes of antibiotic-associated diarrhea and is the most common cause of healthcare-associated diarrhea.

### C. difficile Infection (CDI)

- Patient exhibits clinical symptoms to include:
  - **Diarrheal stools**: frequent, watery, unformed (conforms to the shape of a container), ≥ 3 per day, and a history of antibiotic exposure
  - **Fever**
  - **Loss of appetite**
  - **Nausea**
  - **Abdominal pain, tenderness, or cramping**

- Stool sample is positive for *C. difficile* by polymerase chain reaction (PCR).

### Transmission

- *C. difficile* is shed in feces. Any surface, device, or material (e.g., commodes, bathing tubs, or electronic rectal thermometers) that become contaminated with feces may serve as a reservoir for *C. difficile* spores.
- *C. difficile* spores can be transferred to patients via the hands of healthcare personnel and by a non-disinfected environment.

### Risk Factors

- **Prior antibiotics**: clindamycin, cephalosporins, fluoroquinolones are notoriously associated with CDI and should be avoided. Alternative agents should be considered.
- Proton pump inhibitors (PPIs) and H₂ blockers
- Gastrointestinal surgery and/or manipulation
- Long length of stay in healthcare settings
- Serious underlying illness
- Immunocompromised e.g., cancer or chemotherapy (within 2 weeks)
- Advanced age (≥ 60 years)

### Testing for Diagnosis

- See Appendix A and B for risk factors, severity of illness, testing / decision support.
- Testing for *C. difficile* toxin B gene by PCR should **only** be ordered in patients with ≥ 3 unformed watery stools in a 24 hour period.
- **Note**: Concurrent receipt of laxatives or opioid antagonists may cause loose stools or an unanticipated surge in output and should be taken into consideration **prior** to ordering of CDI testing.
- Testing of formed stool will be rejected unless ileus is suspected; if so, the lab must be notified.
- **Note**: It is quite rare (< 1% cases) for ileus to be caused by *C. difficile*.

### Potential Complications

- Pseudomembranous colitis (PMC)
- Toxic megacolon
- Colon perforation
- Sepsis, Death
- Consider consultation to **Infectious Diseases**
- Consider consultation to **Acute Care Surgery** if there is no improvement after 3-5 days of appropriate therapy.
- **Recommend** immediate/urgent **Acute Care Surgery** consultation for severe, complicated, or recurrent disease prior to the development of shock or multi-organ system failure due to *C. difficile*.

### Prevention

- Minimize the number and duration of antimicrobial agents prescribed.
- Minimize use of PPIs and H₂ blockers.
- Discontinue laxatives, alvimopan (Enterex), methylphenidate (Ritalin) to avoid unnecessary CDI testing.
- **Consider** use of probiotics to prevent recurrence.
Enteric Contact Precautions

- If suspect or proven CDI, patient must be in enteric contact precautions (use orange signage).
- Perform hand hygiene with soap and water prior to leaving the room.
- Alcohol hand rub is **NOT** effective against *C. difficile* spores.
- **Use patient-specific dedicated equipment.**
- Continue precautions until diarrhea resolves.
- Clean and disinfect all environmental surfaces and reusable devices with bleach-wipes.
- All enteric contact isolation rooms are to be cleaned with a sporidical agent daily and upon discharge.
- Ultraviolet disinfection is used daily in bathrooms and as feasible at patient discharge.

Treatment

*See Appendix A* for recommendations on risk assessment and decision support, and Appendix B for treatment options.

- In some patients, *C. difficile* symptoms will resolve within ~3 days by discontinuing antibiotic(s).
- *C. difficile* infection can be assessed using a scoring system to determine severity of illness and guide therapy.
  - See Appendix A.
- Do not attempt to treat or decolonize asymptomatic *C. difficile* carriers.
- **After successful treatment, retesting of asymptomatic patients is NOT recommended.**
- If antibiotics are required for a concurrent infection, prolonged CDI treatment can be decided on a case-by-case basis.
- Avoid use of anti-peristaltic agents, which may obscure symptoms and precipitate toxic megacolon.
- Cholestyramine, colestipol, and other anion-exchange resins bind vancomycin, so should not be used in the management of *C. difficile* infections.

**Note:** See OSUWMC Fecal Microbiota Transplant (FMT) for the Treatment of *Clostridium difficile* Infection guideline for additional information on treating *Clostridium difficile*.

Patient Education Materials

- *Clostridium difficile* (*C. difficile*)
- Preventing the Spread of Infection

References


Quality Measures

- Number of patients with *C. difficile*
- Hospital-associated rates and comparisons
- Hand hygiene compliance
- Readmissions due to *C. difficile*
Guideline Authors

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Guideline Approved


Disclaimer: Clinical practice guidelines and algorithms at The Ohio State University Wexner Medical Center (OSUWMC) are standards that are intended to provide general guidance to clinicians. Patient choice and clinician judgment must remain central to the selection of diagnostic tests and therapy. OSUWMC’s guidelines and algorithms are reviewed periodically for consistency with new evidence; however, new developments may not be represented.

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Appendix A. *C. difficile* Risk Assessment and Decision Support

**Table 1. Major Criteria**

<table>
<thead>
<tr>
<th>Risk Factor</th>
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<tbody>
<tr>
<td>Age ≥ 65 years</td>
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<tr>
<td>≥ 2 admissions in previous 60 days</td>
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<tr>
<td>Prolonged length of stay (30 days) ± 18 days</td>
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<tr>
<td>Multiple (≥ 3) antibiotics given concomitantly</td>
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<tr>
<td>Immunosuppression</td>
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<tr>
<td>Mechanical ventilation</td>
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<tr>
<td>Recent albumin ≤ 2.5 gm/dl</td>
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</tbody>
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**Table 2. CDI Severity of Illness Score**

<table>
<thead>
<tr>
<th>Clinical Findings</th>
<th>Points*</th>
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</thead>
<tbody>
<tr>
<td>Fever (100.4°F)</td>
<td>1</td>
</tr>
<tr>
<td>Ileus</td>
<td>1</td>
</tr>
<tr>
<td>Systolic BP &lt; 100 mmHg</td>
<td>1</td>
</tr>
<tr>
<td>WBC ≥ 15,000**</td>
<td>1</td>
</tr>
<tr>
<td>WBC ≥ 30,000**</td>
<td>2</td>
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**CT Scan Findings***

- thickened colonic wall, colonic dilation, ascites

<table>
<thead>
<tr>
<th>Findings</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 finding</td>
<td>1</td>
</tr>
<tr>
<td>≥ 2 findings</td>
<td>2</td>
</tr>
</tbody>
</table>

*Severe disease is associated with CDI Score ≥ 3.

**Any single reading within 3 days of CDI diagnosis.

*** Obtaining a CT scan is not mandatory.

1. Opioid antagonists include agents such as: Entereg® (alvimopam), Relistor® (methylaltrexone), etc.
## Appendix B. Treatment of *C. difficile* Infection

<table>
<thead>
<tr>
<th>Clinical Definition</th>
<th>Recommended Treatment</th>
<th>Supportive Clinical Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial episode, mild or moderate</td>
<td>Metronidazole 500 mg 3 times per day orally for 10-14 days</td>
<td>Metronidazole is not recommended for the treatment of CDI in severely immunocompromised patients such as those who have received an allogeneic stem cell transplant or who have graft vs. host disease (GVHD).*</td>
</tr>
<tr>
<td>Initial episode, severe</td>
<td>Vancomycin 125 mg 4 times per day orally for 10-14 days OR Fidaxomicin** 200 mg 2 times per day orally for 10 days (Consider for patients on concomitant antimicrobials)</td>
<td>See Appendix A</td>
</tr>
<tr>
<td>Initial episode, severe, complicated</td>
<td>Vancomycin 500 mg 4 times per day orally*** PLUS Metronidazole 500 mg every 8 hours intravenously OR Fidaxomicin** 200 mg 2 times per day orally for 10 days PLUS Metronidazole 500 mg every 8 hours intravenously Consider for patients on concomitant antimicrobial therapy. If complete ileus, consider adding rectal instillation of vancomycin 500 mg every 8 hours.</td>
<td>Hypotension or shock, ileus, megacolon</td>
</tr>
<tr>
<td>First recurrence****</td>
<td>Fidaxomicin** 200 mg 2 times per day orally for 10 days OR Same as initial episode (Metronidazole 500 mg 3 times per day orally OR vancomycin 125 mg 4 times per day orally)</td>
<td>---</td>
</tr>
<tr>
<td>Second recurrence****</td>
<td>Fidaxomicin** 200 mg 2 times per day orally for 10 days OR Vancomycin in a tapered regimen (125 mg four times per day orally for 10-14 days, 125 mg two times per day orally for 7 days, 125 mg once per day orally for 7 days, 125 mg one time every 2 or 3 days orally for 2-8 weeks)</td>
<td>---</td>
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</tbody>
</table>

* Based on evolving data specific to immunocompromised hosts and CDI and expert opinion.

** Fidaxomicin requires prior approval between 8 am - 5 pm, 7 days a week. Orders received between 8 am - 5 pm must have an authorization code obtained from an Infectious Diseases Consult or the Antimicrobial Stewardship Program (ASP), on-call pager # 9394.

*** Based on improved outcome in those with recurrences and higher vancomycin dose and less *C. difficile* recovered in stool (McFarland LV, 2002); and consensus national recommendations (Cohen SH, 2010).

**** Recurrence is defined as the patient having ≥ 3 unformed watery stools in a 24-hour period, > 2 weeks and < 8 weeks of completing CDI therapy.

Note: See OSUWMC Fecal Microbiota Transplant (FMT) for the Treatment of *Clostridium difficile* Infection guideline for additional information on treating *Clostridium difficile*. A Fecal Microbiota Transplant (FMT) can be considered for patients meeting any of the following criteria:
- Recurrent CDI after ≥ 2 episodes of mild-to-moderate CDI and failure to respond to appropriate antimicrobial treatment
- ≥ 2 episodes of severe CDI resulting in hospitalization and significant morbidity within 1 year.
- Severe first episode of active CDI requiring hospitalization and non-responsive to maximal medication therapy