

Frequently Asked Questions about *Clostridium difficile* for Healthcare Providers

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What is *Clostridium difficile*?

Clostridium difficile is a spore-forming, gram-positive anaerobic bacillus that produces two exotoxins: toxin A and toxin B. It is a common cause of antibiotic-associated diarrhea (AAD). It accounts for 15-25% of all episodes of AAD.

What diseases result from *Clostridium difficile* infection?

- pseudomembranous colitis (PMC)
- toxic megacolon
- perforations of the colon
- sepsis
- death (rarely)

What are the main clinical symptoms of *Clostridium difficile* infection?

Clinical symptoms include:

- watery diarrhea
- fever
- loss of appetite
- nausea
- abdominal pain/tenderness

Which patients are at increased risk for *Clostridium difficile* infection?

The risk for disease increases in patients with:

- antibiotic exposure
- gastrointestinal surgery/manipulation
- long length of stay in healthcare settings
- a serious underlying illness
- immunocompromising conditions
- advanced age

What are the differences between *Clostridium difficile* colonization and *Clostridium difficile* -infection?

Clostridium difficile colonization

- patient exhibits NO clinical symptoms
- patient tests positive for *Clostridium difficile* organism and/or its toxin
- more common than the *Clostridium difficile* infection

Clostridium difficile infection

- patient exhibits clinical symptoms
- patient tests positive for the *Clostridium difficile* organism and/or its toxin

Which laboratory tests are commonly used to diagnose *Clostridium difficile* infection?

- Stool culture for *Clostridium difficile*: While this is the most sensitive test available, it is the one most often associated with false-positive results due to presence nontoxigenic *Clostridium difficile* strains. However, this can be overcome by testing isolates for toxin production (i.e. so called “toxigenic culture”). Nonetheless, stool cultures for *Clostridium difficile* are labor intensive, require an appropriate culture environment to grow anaerobic microorganisms, and have a relatively slow turn-around time (i.e. results available in 48-96 hours) making them overall less clinically useful. Results of toxigenic cultures do serve as a gold-standard against which other test modalities are compared in clinical trials of performance.
- Molecular tests: FDA-approved PCR assays, which test for the gene encoding toxin B, are highly sensitive and specific for the presence of a toxin-producing *Clostridium difficile* organism.
- Antigen detection for *Clostridium difficile* : These are rapid tests (<1 hr) that detect the presence of *Clostridium difficile* antigen by latex agglutination or immunochromatographic assays. Because results of antigen testing alone are non-specific, antigen assays have been employed in combination with tests for toxin detection, PCR, or toxigenic culture in two-step testing algorithms.
- Toxin testing for *Clostridium difficile* *:
 - Tissue culture cytotoxicity assay detects toxin B only. This assay requires technical expertise to perform, is costly, and requires 24-48 hr for a final result. It does provide specific and sensitive results for *Clostridium difficile* infection. While it served as a historical gold standard for diagnosing clinical significant disease caused by *Clostridium difficile* , it is recognized as less sensitive than PCR or toxigenic culture for detecting the organism in patients with diarrhea.
 - Enzyme immunoassay detects toxin A, toxin B, or both A and B. Due to concerns over toxin A-negative, B-positive strains causing disease, most laboratories employ a toxin B-only or A and B assay. Because these are same-day assays that are relatively inexpensive and easy to perform, they are popular with clinical laboratories. However, there are increasing concerns about their relative insensitivity (less than tissue culture cytotoxicity and much less than PCR or toxigenic culture).
- *Clostridium difficile* toxin is very unstable. The toxin degrades at room temperature and may be undetectable within 2 hours after collection of a stool specimen. False-negative results occur when specimens are not promptly tested or kept refrigerated until testing can be done.

How is *Clostridium difficile* transmitted?

Clostridium difficile is shed in feces. Any surface, device, or material (e.g., commodes, bathing tubs, and electronic rectal thermometers) that becomes contaminated with feces may serve as a reservoir for the *Clostridium difficile* spores. *Clostridium difficile* spores are transferred to patients mainly via the hands of healthcare personnel who have touched a contaminated surface or item.

How is *Clostridium difficile* infection usually treated?

In about 20% of patients, *Clostridium difficile* infection will resolve within 2-3 days of discontinuing the antibiotic to which the patient was previously exposed. The infection can usually be treated with an appropriate course (about 10 days) of antibiotics including metronidazole or vancomycin (administered orally). After treatment, repeat *Clostridium difficile* testing is not recommended if the patients' symptoms have resolved, as patients may remain colonized.

How can *Clostridium difficile* infection be prevented in hospitals and other healthcare settings?

- Use antibiotics judiciously
- Use Contact Precautions: for patients with known or suspected *Clostridium difficile* infection:
 - Place these patients in private rooms. If private rooms are not available, these patients can be placed in rooms (cohorted) with other patients with *Clostridium difficile* infection.
 - Use gloves when entering patients' rooms and during patient care.
 - Perform Hand Hygiene after removing gloves.
 - Because alcohol does not kill *Clostridium difficile* spores, use of soap and water is more efficacious than alcohol-based hand rubs. However, early experimental data suggest that, even using soap and water, the removal of *C. difficile* spores is more challenging than the removal or inactivation of other common pathogens.
 - Preventing contamination of the hands via glove use remains the cornerstone for preventing *Clostridium difficile* transmission via the hands of healthcare workers; any theoretical benefit from instituting soap and water must be balanced against the potential for decreased compliance resulting from a more complex hand hygiene message.
 - If your institution experiences an outbreak, consider using only soap and water for hand hygiene when caring for patients with *Clostridium difficile* infection.
 - Use gowns when entering patients' rooms and during patient care.
 - Dedicate or perform cleaning of any shared medical equipment.
 - CONTINUE THESE PRECAUTIONS UNTIL DIARRHEA CEASES
 - Because *Clostridium difficile* -infected patients continue to shed organism for a number of days following cessation of diarrhea, some institutions routinely continue isolation for either several days beyond symptom resolution or until discharge, depending upon the type of setting and average length of stay.
- Implement an environmental cleaning and disinfection strategy:
 - Ensure adequate cleaning and disinfection of environmental surfaces and reusable devices, especially items likely to be contaminated with feces and surfaces that are touched frequently.
 - Consider using an Environmental Protection Agency (EPA)-registered disinfectant with a sporicidal claim for environmental

surface disinfection after cleaning in accordance with label instructions; generic sources of hypochlorite (e.g., household chlorine bleach) also may be appropriately diluted and used. (Note: Standard EPA-registered hospital disinfectants are not effective against *Clostridium difficile* spores.) Hypochlorite-based disinfectants may be most effective in preventing *Clostridium difficile* transmission in units with high endemic rates of *Clostridium difficile* infection.

- Follow the manufacturer's instructions for disinfection of endoscopes and other devices.
- Recommended infection control practices in long term care and home health settings are similar to those practices taken in traditional health-care settings.

What can I use to clean and disinfect surfaces and devices to help control *Clostridium difficile*?

Surfaces should be kept clean, and body substance spills should be managed promptly as outlined in CDC's "[Guidelines for Environmental Infection Control in Health-Care Facilities](#)." [PDF 1.4 MB] ([/hicpac/pdf/guidelines/eic_in_HCF_o3.pdf](#)) Routine cleaning should be performed prior to disinfection. EPA-registered disinfectants with a sporicidal claim have been used with success for environmental surface disinfection in those patient-care areas where surveillance and epidemiology indicate ongoing transmission of *Clostridium difficile*.

Note: EPA-registered disinfectants are recommended for use in patient-care areas. When choosing a disinfectant, check product labels for inactivation claims, indications for use, and instructions.

Where can I get more information?

The Centers for Disease Control and Prevention also has [General Information about *Clostridium difficile*](#) ([/HAI/organisms/cdiff/about_Cdiff.html](#)) and more information about [Gastrointestinal Infections in Healthcare Settings](#). ([/HAI/organisms/gi.html](#))

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