Clostridioides difficile Infection (CDI): Recommendations for Healthcare Outbreak Response

BACKGROUND

Clostridioides difficile (formerly *Clostridium difficile*) is a spore-forming, gram-positive anaerobic bacillus.[1] *Clostridioides difficile* infection (CDI) is related to antibiotic exposure and most commonly manifests as gastrointestinal illness, ranging from uncomplicated diarrhea to severe and life-threatening pseudomembranous colitis.[2] CDI, a frequent cause of healthcare-associated infections, can result in increased length of hospital stay, costs, illness, and death.[3] CDI can spread from patient to patient through environmental surfaces or shared medical equipment or on the hands of healthcare workers.[4] Outbreaks of CDI occur in healthcare settings, such as acute-care hospitals and nursing homes, where potential exists for a large number of susceptible hosts to be exposed to infectious spores.[4] Rapid identification of CDI clusters, with prompt investigation and implementation of containment measures, can prevent additional infections.[5]

FEATURED RESOURCES

- California Department of Public Health. *Clostridioides difficile* Infection in Healthcare Facilities Quicksheet
- California Department of Public Health. Investigating *Clostridium difficile* Infections
- CDC. *C. diff* Guidelines and Prevention Resources

OUTBREAK DETECTION AND REPORTING

A. Proposed Investigation/Reporting Thresholds and Outbreak Definition

The thresholds presented here are intended to facilitate prevention of *C. difficile* cases and promote collaboration with public health; thresholds are based on expert opinion except as noted otherwise. States and local jurisdictions may have their own outbreak definitions and requirements for reporting. Facilities should consult or collaborate with public health for guidance about threshold for investigation in units or facilities with high incidence or prevalence. A high incidence or prevalence may indicate ongoing transmission or infection control gaps.

The "threshold for facility to conduct additional investigation" refers to the *initial* basic investigation triggered by a positive laboratory test; it includes a review of reasons for testing

to determine appropriate testing and documentation of clinical symptoms, at a minimum (Table).

For clinical CDI, patients should meet criteria for diarrhea (≥3 loose feces within 24 hours). Diagnostic stewardship prevents testing of patients with solid fecal samples or alternative explanations for diarrhea (e.g., receipt of laxatives or tube feeds). Note that nucleic acid amplification tests are very sensitive and do not distinguish CDI from asymptomatic colonization.

Because *C. difficile* is common, patients often are colonized, and risk factors are multifactorial; therefore, determining whether multiple cases constitute an outbreak is difficult. In lieu of defining an outbreak, experts have developed thresholds for when a facility should conduct an initial investigation and when it should report to public health. When the reporting threshold is reached, the facility and public health agency should collaborate to identify and mitigate *C. difficile* risks.

Table. Thresholds for investigation and reporting of a possible *Clostridioides difficile* infection (CDI) outbreak

Threshold	Acute-Care And Long-Term Acute Care Hospitals	Long-Term Acute-Care Hospitals	Critical Access Hospitals	Nursing Homes
For facility to conduct additional investigation	≥3 patients with facility-onset* *C. difficile* (determined by a positive laboratory test†) in the facility within a 4-week period	≥3 patients with facility-onset* *C. difficile* (determined by a positive laboratory test†) in the facility within a 4-week period of time	≥2 patients with facility-onset* *C. difficile* (determined by a positive laboratory test†) in the facility within a 4-week period	≥2 residents with facility-onset* *C. difficile* (determined by a positive laboratory test†) in the facility within a 4-week period
For reporting to public health	≥3 patients with facility-onset* CDI‡ in the facility within a 4-week period	≥3 patients with facility-onset* CDI‡ in the facility within a 4-week period	≥2 patients with facility-onset* CDI‡ in the facility within a 4-week period	≥3 residents with facility-onset* CDI‡ in the facility within a 4-week period

*Facility-onset: Specimen obtained on facility day 4 or later (admission date = day 1).
†[2]Positive laboratory test: Any molecular, antigen, culture, or other test for *C. difficile*.
‡CDI: Positive laboratory test AND symptoms (diarrhea, i.e., 3 loose feces over 24 hours) AND no laxative use for at least 48 hours before specimen collection AND no other known cause for diarrhea.

B. Points for Consideration

B.1. The 4-week period is based on expert consensus.

B.2. Threshold definitions for facilities to begin investigation are based on positive laboratory testing. Consider the testing protocols of the facility, including use of screening for asymptomatic carriers, as well as the increasing use of enteric PCR panels that, because of increased sensitivity, might detect colonization rather than infection.

B.3. *C. difficile* prevalence can vary greatly across the United States. For this reason, multiple factors should be considered when appropriate facility-specific or regional-specific thresholds are determined. Thresholds should be modified in collaboration between the facility and public health. Factors to consider include the following:

B.3.1. Size of facility,

B.3.2. Prevalence of *C. difficile* in the unit/facility/region,

B.3.3. Unit type, and

B.3.4. Patient population.

B.4. In some situations, facilities or public health might identify a possible community-onset outbreak of *C. difficile*. Facilities should report to public health ≥2 cases of community-onset, laboratory-confirmed *C. difficile* for which onset occurred within a 4-week period and that are epidemiologically linked, especially cases classified as severe complicated infection. Public health should consider further investigation.

B.4.1. Community-onset *C. difficile*: Specimen obtained on facility day 1, 2, or 3 (admission date = day 1) or when the patient is not admitted to any facility or does not have a history of recent hospitalization.

B.4.2. Severe complicated CDI includes fulminant *C. difficile*: hypotension or shock, ileus, or megacolon.[5]

B.5. Consider that, although some patients may have recurrent disease (and therefore might not have acquired *C. difficile* as part of transmission), patients with recurrent disease can transmit *C. difficile* and therefore be part of ongoing transmission. The National Healthcare Safety Network (NHSN) classifies *C. difficile* cases as follows:

B.5.1. Incident *C. difficile*: any *C. difficile*–positive laboratory test from a specimen obtained >8 weeks after the most recent *C. difficile* laboratory test (or with no previous *C. difficile*–positive laboratory test).

B.5.2. Recurrent C*. difficile*: any *C. difficile*–positive laboratory test from a specimen obtained >14 days and < 8 weeks after the most recent *C. difficile* laboratory test.

B.5.3. Duplicate *C. difficile*: any *C. difficile*–positive laboratory test from a specimen obtained within the past 14 days after the most recent *C. difficile* laboratory test.

INVESTIGATION AND CONTROL

The following sections outline important actions and considerations in investigating a potential outbreak of CDI in a healthcare facility (see the references for additional details). Some of these actions can be conducted by the facility; others may require assistance from public health. Collaboration between the facility and public health helps ensure a successful investigation. Health department staff might be able to assist with guidance, infection control assessment, medical records review, laboratory testing, data analysis, and other activities. The need for an on-site visit to the facility should be determined on the basis of the number of cases, patient population, severity of illness, and level of assistance required.

A. Initial Investigation/Case Review

A.1. Ensure timeliness and appropriateness of CDI testing practices. Discourage testing of persons with <3 loose stools in a 24-hour period, patients with solid stool samples or other explanations for diarrhea (e.g., laxatives or tube feeds).[3]

A.2. If it is determined that the outbreak signal derived from inappropriate testing, consider halting the investigation and working to improve CDI testing practices instead.

A.3. General screening for asymptomatic *C. difficile* carriage is not recommended.[6] However, testing of high-risk patients for *C. difficile* can be considered if concern exists that asymptomatic carriers are a source of transmission during an outbreak.[7]

A.4. Testing for cure is not recommended.

A.5. Perform additional case finding (e.g., through review of laboratory records, medical charts).

A.6. Construct a line list that includes such elements as admission date, admission source, location of patient in the facility, movement of the patient within the facility, symptom onset date, date of positive test, testing method, history of CDI, prior antibiotic use, and discharge date.[1] See [2] for an example of a line list(Appendix C in the referenced toolkit document).

A.7. Use the line list to identify commonalities among patients. Determine whether cases are epidemiologically linked and whether evidence exists of transmission.

A.8. In the context of an outbreak, establish a case definition (separate from the National Healthcare Safety Network or other surveillance definitions) that includes patient population, location, time frame, and laboratory and clinical criteria. Consider the use of a tiered case definition (e.g., possible, probable, and/or confirmed).

B. Infection Control Measures

B.1. Patients with CDI (including patients suspected of having CDI while awaiting testing) should be placed on Contact Precautions, including placement in single-patient space or room.[3,8]

B.1.1. Continue contact precautions for at least 48 hours after diarrhea has ceased in a hospital setting, nursing home, or residential care setting.[7]

B.1.2. If the number of private single rooms is limited, 1) prioritize single rooms for CDI patients with fecal incontinence ; 2) cohort patients, providing a dedicated commode or toilet for each patient; and 3) ensure healthcare workers change gloves and gowns and wash hands between residents in multi-occupancy rooms.[3]

B.2. Dedicate patient-care equipment, such as blood pressure cuffs and stethoscopes; use single-use disposable items when possible.[7]

B.3. During an outbreak, wash hands with soap and water to physically remove spores.[3]

B.4. Educate family members and visitors about precautions to prevent *C. difficile* from spreading.[5]

B.5. Audit infection control practices on affected unit(s), including handwashing, contact precautions (e.g., donning and doffing gowns and gloves), and environmental cleaning (see the next section). Provide feedback, education, and additional audits to raise compliance, as needed.

C. Environmental Cleaning and Disinfection

C.1. Audit cleaning procedures on affected units. Consider the use of marking and/or direct observations to ensure cleaning effectiveness. Provide feedback to environmental services staff.[9]

C.2. Perform daily cleaning/disinfection with a *C. difficile* sporicidal agent (EPA List K agent) with particular attention to disinfection of reusable patient care equipment that is used for multiple patients (e.g., thermometers, vital signs machines, glucometer).[10]

C.3. Perform terminal cleaning after CDI patient transfer/discharge with a *C. difficile* sporicidal agent (EPA List K agent). Consider additional disinfection with no-touch technologies (e.g., UV light).[3]

D. Communication

D.1. If a CDI patient is transferred to another facility, communicate CDI status to accepting facility.

D.2. Also communicate CDI status to accepting providers when the patient is moved or transferred within a hospital (e.g., to another unit or to radiology).

E. Antibiotic Stewardship

E.1. A strong antibiotic stewardship program is key to preventing outbreaks of CDI.[3] Evaluate antibiotic use for common infections for which antibiotics are often prescribed inappropriately, such as urinary tract infections and community-acquired pneumonia, to ensure prescribing is in accordance with guidelines.[7]

E.2. Review CDI cases to optimize management. Discontinue unnecessary antibiotics and consider modifying antibiotic regimens to avoid antibiotics that create the greatest risk for CDI, such as clindamycin, fluoroquinolones, and cephalosporins.[11]

E.3. If an outbreak is confirmed, conduct additional reviews of antibiotic-prescribing practices; identify opportunities to improve antibiotic use (e.g., optimize the frequency and duration of antibiotic therapy and the number and types of antibiotic agents prescribed).[3]

F. Monitoring and Follow-Up

F.1. Building on the activities presented in section A, Initial Investigation/Case Review, conduct surveillance for additional symptomatic cases while implementing control measures and assessing infection control practices; use surveillance data to determine whether control measures have interrupted transmission.

F.2. When investigating larger outbreaks, consider using the CDC Targeted Assessment for Prevention (TAP) strategy to review staff awareness and perceptions of policies and practices related to CDI prevention in the affected facility or unit.[12]

F.3. Public health should follow up with the facility (e.g., weekly telephone or email contact) to monitor for additional cases and assess implementation of mitigation measures.

F.4. If no additional cases occur after 4 weeks, consider ending the investigation.

REFERENCES

1. Association of Practitioners in Infection Control. Guide to preventing *C. difficile* infections. http://apic.org/Resource_/EliminationGuideForm/59397fc6-3f90-43d1-9325-e8be75d86888/File/2013CDiffFinal.pdf
2. Greater New York Hospital Association/United Hospital Fund. Reducing *C. difficile* infections toolkit: best practices from the GNYHA/UHF *Clostridium difficile* Collaborative. https://apic.org/Resource_/TinyMceFileManager/Practice_Guidance/cdiff/C.Diff_Digital_Toolkit_GNYHA.pdf
3. McDonald LC, Gerding DN, Johnson S, Bakken JS, Carroll KC, Coffin SE, 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:e1–e48, https://doi.org/10.1093/cid/cix1085
4. CDC. Frequently asked questions for healthcare providers about *C. diff*. https://www.cdc.gov/hai/organisms/cdiff/cdiff_faqs_hcp.html
5. Cohen SH, Gerding DN, Johnson S, Kelly CP, Loo VG, McDonald LC, et al. Clinical practice guidelines for *Clostridium difficile* infection in adults: 2010 update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA). Infect Control Hosp Epidemiol. 2010;31:431–55. https://www.jstor.org/stable/10.1086/651706
6. Duberke ER, Carling P, Carrico R, Donskey CJ, Loo VG, McDonald LC, et al. Strategies to prevent *Clostridium difficile* infections in acute care hospitals: 2014 update. Infect Control Hosp Epidemiol. 2014;*35*:S48–S65. https://www.cambridge.org/core/services/aop-cambridge-

core/content/view/956D9777C4DA349B76F59E6A46553DC6/S0899823X00191949a.pdf/strategies_to_prevent_clostridium_difficile_infections_in_acute_care_hospitals_2014_update.pdf

7. CDC. Strategies to prevent *Clostridioides difficile* infection in acute care facilities. https://www.cdc.gov/hai/prevent/cdi-prevention-strategies.html
8. CDC. Transmission-based precautions. https://www.cdc.gov/infectioncontrol/basics/transmission-based-precautions.html
9. CDC. Options for evaluating environmental cleaning. https://www.cdc.gov/hai/toolkits/evaluating-environmental-cleaning.html
10. US Environmental Protection Agency. LIST K: EPA's registered antimicrobial products effective against *Clostridium difficile* spores. https://www.epa.gov/pesticide-registration/list-k-epas-registered-antimicrobial-products-effective-against-clostridium
11. CDC. Antibiotic prescribing and use in hospitals and long-term care. https://www.cdc.gov/antibiotic-use/healthcare/index.html
12. CDC. The Targeted Assessment for Prevention (TAP) strategy. https://www.cdc.gov/hai/prevent/tap.html

SUPPLEMENTAL RESOURCES

California Department of Public Health. *Clostridioides difficile* infection in healthcare facilities quicksheet. https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CDI_Quicksheet_May2019.pdf%23search=difficile%20quicksheet

California Department of Public Health. Investigating *Clostridium difficile* infections. https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CDI_LHD_051717ADA.pdf

CDC. *C. diff* guidelines and prevention resources. https://www.cdc.gov/cdiff/clinicians/resources.html

CDC. National Healthcare Safety Network (NHSN). Surveillance for *C. difficile* infection (CDI) and multidrug resistant organisms (MDRO). https://www.cdc.gov/nhsn/ltc/cdiff-mrsa/index.html [definitions for nursing homes]

CDC. National Healthcare Safety Network (NHSN). Surveillance for *C. difficile*, MRSA, and other drug-resistant Infections. https://www.cdc.gov/nhsn/acute-care-hospital/cdiff-mrsa/index.html [definitions for acute-care hospitals]

Dubberke ER, Carling P, Carrico R, Donskey CJ, Loo VG, McDonald LC, et al. Strategies to prevent infections in acute care hospital. Infect Control Hosp Epidemiol. 2015;35:628–45.

Duberke ER, Gerding DN. Rationale for hand hygiene recommendations after caring for a patient with *Clostridium difficile* infection. A compendium of strategies to prevent healthcare-associated infections in acute care hospitals. Fall 2011 update. https://www.shea-online.org/images/patients/CDI-hand-hygiene-Update.pdf

Lessa FC, Mu Y, Bamberg WM, Beldavs ZG, Dumyati GK, Dunn JR, et al. Burden of *Clostridium difficile* infection in the United States. N Engl J Med. 2015;372:825–34.

McDonald LC, Gerding DN, Johnson S, Bakken JS, Carroll KC, Coffin SE, 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:e1–e48.

National Nursing Home Quality Improvement Campaign. Assessment of Current CDI Prevention Activities: Early Identification Assessment and Survey - Healthcare Quality Improvement Campaign.

https://nhqualitycampaign.org/assessment-of-current-cdi-prevention-activities/

Web Site
http://corha.org

Source
CORHA Investigation and Control Workgroup

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