



Complete Summary

GUIDELINE TITLE

Strategies to prevent Clostridium difficile infections in acute care hospitals.

BIBLIOGRAPHIC SOURCE(S)

Dubberke ER, Gerding DN, Classen D, Arias KM, Podgorny K, Anderson DJ, Burstin H, Calfee DP, Coffin SE, Fraser V, Griffin FA, Gross P, Kaye KS, Klompas M, Lo E, Marschall J, Mermel LA, Nicolle L, Pegues DA, Perl TM, Saint S, Salgado CD, Weinstein RA, Wise R, Yokoe DS. Strategies to prevent Clostridium difficile infections in acute care hospitals. Infect Control Hosp Epidemiol 2008 Oct;29 Suppl 1:S81-92. [PubMed](#)

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE
METHODOLOGY - including Rating Scheme and Cost Analysis
RECOMMENDATIONS
EVIDENCE SUPPORTING THE RECOMMENDATIONS
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS
QUALIFYING STATEMENTS
IMPLEMENTATION OF THE GUIDELINE
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES
IDENTIFYING INFORMATION AND AVAILABILITY
DISCLAIMER

SCOPE

DISEASE/CONDITION(S)

Clostridium difficile infection (CDI)

GUIDELINE CATEGORY

Management
Prevention
Risk Assessment

CLINICAL SPECIALTY

Critical Care
Geriatrics
Infectious Diseases
Internal Medicine
Nursing
Pediatrics
Preventive Medicine
Surgery

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Clinical Laboratory Personnel
Hospitals
Nurses
Physician Assistants
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To highlight practical recommendations in a concise format designed to assist acute care hospitals in implementing and prioritizing their *Clostridium difficile* infection (CDI) prevention efforts

TARGET POPULATION

Patients in acute care hospitals on antibiotic therapy

INTERVENTIONS AND PRACTICES CONSIDERED

1. Basic practices for prevention and monitoring of *Clostridium difficile* infection (CDI) including:
 - Use of contact precautions
 - Cleaning and disinfection of equipment and environment
 - Laboratory-based alert systems notifying clinical personnel of new cases of CDI
 - CDI surveillance, analysis, and data report
 - Healthcare personnel and patient and family education about CDI
 - Compliance with Centers for Disease Control and Prevention or World Health Organization hand-hygiene and contact precaution recommendations
 - Assignment of accountability
2. Special approaches for prevention of CDI in hospitals with unacceptably high CDI rates including:
 - Risk assessment
 - Minimizing *C. difficile* transmission by healthcare personnel (e.g. hand hygiene)
 - Minimizing *C. difficile* transmission from the environment (e.g. sodium hypochlorite [bleach])

- Reducing the risk of CDI acquisition (antimicrobial stewardship program)

The following approaches should not be considered a routine part of CDI prevention:

- Testing patients without signs or symptoms of CDI for *C. difficile*
- Repeating *C. difficile* testing at the end of successful therapy for a patient recently treated for CDI

MAJOR OUTCOMES CONSIDERED

- Length of hospital stay
- Cost
- Morbidity
- Mortality
- Sensitivity and specificity of surveillance methods

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

For this compendium, the Society for Healthcare Epidemiology of America/Infectious Diseases Society of America (SHEA/IDSA) reviewed previously published guidelines and recommendations relevant to each section and performed computerized literature searches using PubMed. Searches of the English-language literature focused on human studies published after existing guidelines through 2007, using the subject headings listed in Table 2 of the Compendium document (see "Availability of Companion Documents" field).

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Quality of Evidence*

- I. Evidence from ≥ 1 properly randomized, controlled trial
- II. Evidence from ≥ 1 well-designed clinical trial without randomization, from cohort or case-controlled analytic studies (preferably from >1 center), from

- multiple time-series studies, or from dramatic results of uncontrolled experiments
- III. Evidence from opinions of respected authorities based on clinical experience, descriptive studies, or reports of expert committees

*Adapted from the Canadian Task Force on the Periodic Health Examination.

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

In evaluating the evidence regarding the prevention and monitoring of healthcare-associated infections (HAIs), the HAI Allied Task Force followed a process used in the development of other Infectious Diseases Society of America (IDSA) guidelines, including a systematic weighting of the quality of the evidence and the grade of recommendation (see the "Rating Scheme for the Strength of the Evidence" and "Rating Scheme for the Strength of the Recommendations" fields).

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA) Standards and Practice Guidelines Committee convened experts in the prevention and monitoring of healthcare-associated infections (HAIs).

The HAI Allied Task Force met on 17 occasions via teleconference to complete the compendium. The purpose of the teleconferences was to discuss the questions to be addressed, make writing assignments, and discuss recommendations. All members of the HAI Allied Task Force participated in the preparation and review of the draft documents. The compendium was then submitted to a subgroup of the HAI Allied Task Force with implementation expertise that, through a series of additional teleconferences and communications, performed extensive editing and reformatting to create implementation-focused text.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Strength of Recommendation*

- A. Good evidence to support a recommendation for use
- B. Moderate evidence to support a recommendation for use
- C. Poor evidence to support a recommendation

*Adapted from the Canadian Task Force on the Periodic Health Examination.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Review and Approval Process

A critical stage in the development process is peer review. Peer reviewers are relied on for expert, critical, and unbiased scientific appraisals of the documents. The Society for Healthcare Epidemiology of America/Infectious Diseases Society of America (SHEA/IDSA) employed a process used for all SHEA/IDSA guidelines that includes a multilevel review and approval. Comments were obtained from several outside reviewers who complied with the SHEA/IDSA policy on conflict of interest disclosure. In addition, 8 stakeholder organizations provided comments on the document. Finally, the guideline was reviewed and approved by the IDSA Standards and Practice Guidelines Committee and the Board of Directors of the SHEA and the IDSA prior to dissemination.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Recommendations for Implementing Prevention and Monitoring Strategies

Recommendations for preventing and monitoring *Clostridium difficile* infection (CDI) are summarized below. They are designed to assist acute care hospitals in prioritizing and implementing their CDI prevention efforts.

Each recommendation includes a ranking for the strength and the quality of evidence supporting it. Definitions of the levels of evidence (I-III) and grades of recommendation (A-E) are provided at the end of the "Major Recommendations" field.

Definition

A CDI case is defined as a case of diarrhea or toxic megacolon without other known etiology that meets 1 or more of the following criteria: (1) the stool sample yields a positive result of a laboratory assay for *C. difficile* toxin A and/or B, or a toxin-producing *C. difficile* organism is detected in the stool sample by culture or other means; (2) pseudomembranous colitis is seen on endoscopic examination or surgery; and (3) pseudomembranous colitis is seen on histopathological examination.

Basic Practices for Prevention and Monitoring of CDI: Recommended for All Acute Care Hospitals

Components of a CDI Prevention Program

1. Use contact precautions for infected patients, with a single-patient room preferred (**A-II** for hand hygiene, **A-I** for gloves, **B-III** for gowns, and **B-III** for single-patient room) (National Clostridium difficile Standards Group, 2004; Fekety, 1997; Gerding et al., 1995; Simor et al., 2002).
 - Place patients with CDI under contact precautions to help reduce patient-to-patient spread of the organism.
 - Place patients in private rooms when available.
 - Don gown and gloves on entry to the patient's room.
 - Gloves should be changed immediately if visibly soiled and after touching or handling surfaces or materials contaminated with feces.
 - Remove gown and gloves before exiting the room.
 - Conduct Centers for Disease Control and Prevention- or World Health Organization-compliant hand hygiene on exiting the patient's room.
 - Cohorting patients with CDI is acceptable when single, private rooms are not available.
 - Place patients with stool incontinence preferentially in private rooms.
 - Do not cohort patients who have discordant status of infection or colonization with other epidemiologically important organisms (e.g., vancomycin-resistant enterococcus [VRE] and methicillin-resistant *Staphylococcus aureus* [MRSA]).
 - Remove gowns and gloves and perform hand hygiene when moving from one patient to another.
 - Ensure that adequate supplies for contact precautions are readily available.
 - Management leaders are responsible to ensure that necessary barrier-equipment supplies (e.g., gowns and gloves) and hand-hygiene products are readily available.
 - Assign responsibility for monitoring the availability and restocking of supplies to specific healthcare personnel.
 - Criteria for discontinuing contact precautions
 - The Centers for Disease Control and Prevention currently recommends contact precautions for the duration of illness when caring for patients with CDI (Centers for Disease Control and Prevention, 2005). Some experts recommend continuing contact precautions for at least 48 hours after diarrhea resolves. Areas of controversy include the following: (a) A symptomatically colonized patients (including, in many cases, those successfully treated for CDI) continue to shed *C. difficile* spores, but the number of spores and degree of contamination is not as great as for patients with active CDI. There are currently no data to support isolation of these asymptomatic patients (Dubberke et al., 2007; Johnson et al., 1990; McFarland, 1989). (b) Prolonging the duration of contact

isolation for patients with CDI is recommended when CDI is not effectively controlled by the use of basic practices (see below: II. Special Approaches for the Prevention of CDI). Similarly, there are no data to indicate the efficacy of this practice at this time.

2. Ensure cleaning and disinfection of equipment and the environment (**B-III** for equipment and **B-II** for the environment).
 - *C. difficile* spores contaminate the environment in which patients are housed and the equipment used to care for them (Gerding et al., 1995; Simor et al., 2002; Dubberke et al., 2007; Johnson et al., 1990; McFarland, 1989). This includes the following:
 - Furnishings in the room, including over-bed tables, bed rails, furniture, sinks, floors, commodes, and toilets
 - Patient care equipment that directly touches patients, such as thermometers, stethoscopes, and blood pressure cuffs
 - "High-touch" (i.e., frequently touched) surfaces, such as door knobs and intravenous fluid pumps
 - *C. difficile* appears to contaminate very few surfaces outside patient rooms (Dubberke et al., 2007).
 - Contaminated surfaces and equipment are potential reservoirs for transmission of *C. difficile*.
 - Recent guidelines have outlined environmental disinfection protocols (Sehulster & Chinn, 2003). There are no US Environmental Protection Agency-registered products specific for inactivating *C. difficile* spores. Data are conflicting as to whether inactivation of spores is necessary to prevent *C. difficile* transmission, especially in a setting of endemicity.
 - Facilities should consider using a 1:10 dilution of sodium hypochlorite (household bleach) for environmental disinfection in outbreak settings and settings of hyperendemicity in conjunction with other infection prevention and control measures (see below: II. Special Approaches for the Prevention of CDI). The bleach solution should have a contact time of at least 10 minutes (Perez, Springthorpe, & Sattar, 2005).
 - Develop and implement protocols for disinfection of equipment and the environment.
 - On a routine basis, assess adherence to protocols and the adequacy of cleaning.
 - Assess the adequacy of cleaning before changing to a new cleaning product (e.g., bleach). If cleaning is not adequate, address this before changing products (see below: Special Approaches for the Prevention of CDI).
 - Because of the high turnover of housekeeping personnel, educate personnel on proper cleaning technique frequently. Ensure that education is provided in the personnel's native language.
 - Dedicate noncritical patient care items, such as blood pressure cuffs, stethoscopes, and thermometers, to a single patient with CDI.
 - When this is not possible, ensure adequate cleaning and disinfection of shared items between patient encounters. Ensure that the manufacturers' recommendations for contact time of disinfectants are followed.

3. Implement a laboratory-based alert system to provide immediate notification to infection prevention and control personnel and clinical personnel about patients with newly diagnosed CDI (**B-III**).
 - To place patients with CDI under contact precautions in a timely manner, it is important that an alert system be developed between the laboratory and both infection prevention and control personnel and clinical personnel caring for the patient. This alert system should immediately notify infection prevention and control and clinical personnel when a patient has newly diagnosed CDI.
 - There are a variety of methods by which this information can be transmitted, but some options include fax alerts, phone call and pager alerts, or automated secure electronic alerts.
 - The alert system should not rely on fax transmissions alone, because there may be delays from the time the transmission is received to the time it is seen by an appropriate healthcare provider.
 - Alert patient care areas of positive test results immediately, so that these patients can be placed under contact precautions.
 - When a patient has active CDI, communicate the CDI status when transferring the patient to another healthcare facility, so that appropriate precautions can be implemented at the accepting facility.
4. Conduct CDI surveillance and analyze and report CDI data (**B-III**).
 - At a minimum, calculate healthcare facility-onset, healthcare facility-associated CDI rates at the unit/ward and organizational levels (see Table 1 in the original guideline document) (McDonald et al., 2007; Kuijper, Coignard, & Tull, 2006).
 - Provide CDI data and other CDI prevention process and outcome measures to key stakeholders, including senior leadership, physicians, nursing staff, and other clinicians.
 - Provide the process and outcome measures outlined in the "Performance Measures" section of the original guideline document to appropriate hospital staff and administrators on a regular basis. The frequency with which these data are provided will depend on the hospital's existing reporting structure and the type of data collected. These data can be added to routine quality assessment and performance improvement reports.
5. Educate healthcare personnel, housekeeping personnel, and hospital administration about CDI (**B-III**).
 - Include risk factors, routes of transmission, local CDI epidemiology, patient outcomes and treatment, and prevention measures (including Centers for Disease Control and Prevention and World Health Organization recommendations regarding proper hand hygiene, contact precautions, and management of multidrug-resistant organisms) (Boyce & Pittet, 2002; Garner, 1996; Siegel et al., 2007).
6. Educate patients and their families about CDI, as appropriate (**B-III**).
 - Although often not considered part of a program to reduce transmission of multidrug-resistant organisms, proper education may help to alleviate patient fears regarding being placed in isolation (Lewis, Gammon, & Hosein, 1999).

- Include information about anticipated questions: general information about CDI, colonization versus infection, the hospital's CDI prevention program, the components of and rationale for contact precautions, and the risk of transmission to family and visitors while in the hospital and after discharge. Helpful materials might include patient education sheets in appropriate language(s) and the use of patient education channels, Web sites, or VHS tapes and DVDs.
7. Measure compliance with Centers for Disease Control and Prevention or World Health Organization hand-hygiene and contact precaution recommendations (**B-III**).
- Patient-to-patient transmission of *C. difficile* is thought to occur primarily through transient contamination of the hands of healthcare personnel with spores.
 - Glove use when caring for patients with CDI or touching surfaces in their rooms has been shown to be effective at preventing the transmission of *C. difficile*.
 - Hand-hygiene practices in compliance with Centers for Disease Control and Prevention or World Health Organization guidelines are critical to *C. difficile* control and prevention. Evidence-based recommendations for implementation and assessment of hand-hygiene programs in healthcare settings have been published (Boyce & Pittet, 2002).
 - Area of controversy: There are concerns regarding reliance on alcohol-based hand-hygiene products, because alcohol is not sporicidal. Conversely, hand washing with soap and water is associated with much lower compliance. In settings where CDI is endemic, it appears the potential decrease in efficacy of alcohol-based hand-hygiene products for removing spores, compared with hand washing, may be offset by the increase in hand-hygiene adherence with alcohol-based hand-hygiene products, if contact precautions are followed (i.e., if gloves and gowns are worn) when caring for patients with CDI (Boyce et al., 2006).

Accountability

1. The hospital's chief executive officer and senior management are responsible for ensuring that the healthcare system supports an infection prevention and control program that effectively prevents CDI and the transmission of epidemiologically significant pathogens.
2. Senior management is accountable for ensuring that an adequate number of trained personnel are assigned to the infection prevention and control program.
3. Senior management is accountable for ensuring that healthcare personnel, including licensed and nonlicensed personnel, are competent to perform their job responsibilities.
4. Direct healthcare providers (such as physicians, nurses, aides, and therapists) and ancillary personnel (such as housekeeping and equipment-processing personnel) are responsible for ensuring that appropriate infection prevention and control practices are used at all times (including hand hygiene, standard

- and isolation precautions, and cleaning and disinfection of equipment and the environment).
5. Hospital and unit leaders are responsible for holding personnel accountable for their actions.
 6. The person who manages the infection prevention and control program is responsible for ensuring that an active program to identify CDI is implemented, that data on CDI are analyzed and regularly provided to those who can use the information to improve the quality of care (e.g., unit staff, clinicians, and hospital administrators), and that evidence-based practices are incorporated into the program.
 7. Personnel responsible for healthcare personnel and patient education are accountable for ensuring that appropriate training and educational programs to prevent CDI are developed and provided to personnel, patients, and families.
 8. Personnel from the infection prevention and control program, the laboratory, and information technology departments are responsible for ensuring that systems are in place to support the surveillance program.

Special Approaches for the Prevention of CDI

Perform a CDI risk assessment. These special approaches are recommended for use in locations and/or populations within the hospital that have unacceptably high CDI rates despite implementation of the basic CDI prevention strategies listed above.

There are several unresolved issues regarding CDI prevention. This is apparent when reviewing the rankings of each recommendation on the basis of the quality of the data to support it. As a result, implementation of the recommendations beyond the basic practices to prevent CDI should be individualized at each healthcare facility. One may consider a "tiered" approach in which recommendations are instituted individually or in groups; additional "tiers" are added if CDI rates do not improve, with implementation of basic practices as the first tier.

Approaches to Minimize C. difficile Transmission by Healthcare Personnel

1. Intensify the assessment of compliance with process measures (**B-III**).
 - Contact precautions: Gowns and gloves should be worn by all healthcare personnel who enter the rooms of patients under contact precautions.
 - Hand hygiene: Hand hygiene should be performed on entry and exit from patient rooms. When hand washing is performed, determine whether proper techniques are being used (e.g., hand washing for at least 15 seconds) (Boyce & Pittet, 2002).
 - If hand-hygiene compliance or techniques are not adequate, conduct interventions to improve hand-hygiene compliance and techniques.
2. Perform hand hygiene with soap and water as the preferred method before exiting the room of a patient with CDI (**B-III**).
 - Ensure proper hand-hygiene technique when using soap and water (Boyce & Pittet, 2002).

- Be aware that hand-hygiene adherence may decrease when soap and water is the preferred method.
 - Additional education may be necessary to remind healthcare workers that alcohol-based hand-hygiene products are superior to hand washing for non-spore-forming organisms (e.g., MRSA).
3. Place patients with diarrhea under contact precautions while *C. difficile* test results are pending (**B-III**).
 - To decrease transmission, it is essential to place symptomatic patients under contact precautions as soon as diarrhea symptoms are recognized.
 - If the results of *C. difficile* testing are negative, the patient has a low pretest probability of CDI, and the patient is continent of stool, contact precautions can be discontinued.
 - Because of concerns about the low sensitivity of enzyme immunoassays, clinical suspicion of CDI should outweigh negative test results for patients with a high pretest probability of having CDI.
 4. Prolong the duration of contact precautions after the patient becomes asymptomatic until hospital discharge (**B-III**).
 - Patients may still shed *C. difficile* in their stool after diarrhea resolves (Riggs et al., 2007; Wenisch et al., 1996; Surawicz et al., 2000).

Approaches to Minimize CDI Transmission from the Environment

1. Assess the adequacy of room cleaning (**B-III**).
 - If room cleaning practices are deemed to be inadequate, focus on improving room cleaning techniques.
 - Important issues to address include proper dilution of cleaning products, adequacy of cleaning technique, cleaning "high-touch" surfaces, frequency of changing rags/mop water, and moving from "clean" areas to "dirty" areas.
 - Create a checklist based on cleaning protocols and perform observations to monitor cleaning practice.
 - Environmental culture for *C. difficile* is difficult to perform and requires specialized media; therefore, it is not routinely recommended (Wilcox, Fawley, & Parnell, 2000).
 - Consider environmental decontamination with sodium hypochlorite if room cleaning is deemed to be adequate but there is ongoing CDI transmission (see below).
2. Use sodium hypochlorite (bleach)-containing cleaning agents for environmental cleaning. Implement a system to coordinate with the housekeeping department if it is determined that sodium hypochlorite is needed for environmental disinfection (**B-II**).
 - Area of controversy: Data on the ability of diluted sodium hypochlorite or other sporicidal agents used for environmental decontamination to control CDI have not been consistent. However, a beneficial effect has been reported when bleach has been used in outbreak settings or settings of hyperendemicity, typically in conjunction with other

enhanced CDI control measures (Sehulster & Chinn, 2003; Kaatz & Gitlin, 1988; Wilcox et al., 2003; Mayfield et al., 2000; McDonald, 2007).

- When diluted sodium hypochlorite is instituted for environmental decontamination, it is necessary to coordinate activities with housekeeping staff.
 - Clinical, infection prevention and control, and housekeeping staff will need to determine the location, type, and frequency of diluted sodium hypochlorite use. For instance:
 - All rooms, only rooms of patients with CDI, or outside of patient rooms?
 - Daily cleaning or terminal cleaning only when the patient is discharged or transferred?
- When diluted sodium hypochlorite is used, it is important to address the following issues:
 - Avoid toxicity to patients and staff and damage to equipment and the environment from bleach use. Sodium hypochlorite can be corrosive and irritating to patients, housekeeping staff, and other healthcare personnel.
 - The sodium hypochlorite solution must be mixed fresh daily.
- When sodium hypochlorite will be used only in the rooms of patients with CDI, a system will need to be created to identify these patients to the housekeeping staff.

Approaches to Reduce the Risk of CDI Acquisition

1. Initiate an antimicrobial stewardship program (**A-II**) (National Clostridium difficile Standards Group, 2004; Fekety, 1997; Gerding et al., 1995; Simor et al., 2002; Fowler et al., 2007; Valiquette et al., 2007; Pear et al., 1994).
 - Assess the appropriateness of antimicrobial prescribing practices.
 - Restrict antimicrobials that are strongly associated with CDI and promote appropriate antimicrobial use.

Approaches That Should Not Be Considered a Routine Part of CDI Prevention

1. Do not test patients without signs or symptoms of CDI for *C. difficile* (**B-II**).
 - *C. difficile* toxin tests have been studied in patients with symptoms of CDI and a high pretest probability of having CDI. A positive *C. difficile* toxin test result for a patient without symptoms has a high probability of being a false-positive result.
 - Only stool culture for *C. difficile* has been confirmed to identify patients with asymptomatic *C. difficile* colonization. The sensitivity, specificity, and negative and positive prediction values of antigen and toxin assays are unknown for asymptomatic patients.
 - Obtaining stool specimens requires nursing time to collect and laboratory technician time to perform the test and report results.
 - A positive toxin test result for an asymptomatic patient may result in the initiation of unnecessary treatment for CDI, which may increase the patient's risk of developing CDI in the future (Johnson et al., 1992).

- Do not place patients with asymptomatic *C. difficile* colonization under contact precautions.
 - Area of controversy: Previous research has demonstrated that asymptomatically colonized patients can be a source of transmission of *C. difficile* and that patients can remain colonized after symptoms cease (Johnson et al., 1990; McFarland et al., 1989; Wensch et al., 1996; Surawicz et al., 2000; Wilcox, Fawley, & Parnell, 2000). However, asymptomatically colonized patients are less likely than symptomatic patients to contaminate their surrounding environment or serve as a source of transmission. In some settings, the duration of contact precautions can be extended if there is concern that asymptomatically colonized patients represent a significant source of potential *C. difficile* exposure.
 - Do not attempt to decolonize asymptomatic patients, because this has not been effective and may increase the patient's risk of developing CDI in the future (Johnson et al., 1992).
2. Do not repeat *C. difficile* testing at the end of successful therapy for a patient recently treated for CDI (**B-III**).
- A positive test result may result in unnecessary prolongation of contact precautions and CDI treatment.
 - In some settings, contact precautions may be extended until hospital discharge after symptom resolution (see above). However, there are insufficient data to recommend extending the duration of contact precautions on the basis of whether *C. difficile* or its toxins can be detected in the patient's stool.
 - A positive test result at the end of therapy does not predict who will develop a recurrence or relapse (Surawicz et al., 2000).
 - Repeated *C. difficile* testing does not provide any useful clinical information but requires nursing time to collect the specimen and laboratory technician time to perform the test and report results (Surawicz et al., 2000).

Unresolved Issues

1. Use of gowns and gloves by family members and other visitors
 - The utility of requiring family members and other visitors to wear gowns and gloves to prevent *C. difficile* transmission is unknown (Siegel et al., 2007). The risk that family members and other visitors will transmit *C. difficile* between patients is likely to be related to the degree of contact the visitor has with the patient and the patient's environment, whether the visitor performs hand hygiene, and the degree of interaction the visitor has with other patients. At a minimum, family members and other visitors should be instructed to perform hand hygiene whenever entering or leaving the patient's room.
2. Standing orders or nurse-driven protocols to test all patients with diarrhea for *C. difficile*
 - Nurses frequently know, before the treating physician does, when a patient has diarrhea

3. Admitting-based alert systems that notify infection prevention and control and clinical personnel about readmitted or transferred patients with a history of CDI
 - This information can be integrated into a computerized database used during admission and registration or a separate electronic or paper-based database.
 - If an alert system is implemented, patients with a history of CDI should be placed under contact precautions if they are readmitted only if they have symptoms consistent with CDI at admission. Asymptomatic patients with a history of CDI do not require contact precautions.
 - The duration that the alert should remain active is unknown. Nearly all cases of recurrent CDI occur within 90 days after the last episode. On the basis of this fact, it is reasonable to discontinue the alert 90 days after the last episode of CDI. However, healthcare facilities may not be aware of recurrent episodes of CDI that are diagnosed and managed in outpatient settings, so an arbitrary cutoff based on the last known episode of CDI may inadvertently remove patients with ongoing recurrent CDI.
4. Ongoing assessment of CDI knowledge and intensified CDI education among healthcare personnel
 - Re-educate staff if prior CDI training occurred more than 12 months earlier or if overall knowledge is deemed to be inadequate.
 - Include housekeeping personnel in educational efforts.
5. Restricting the use of gastric acid suppressants (Pepin et al., 2005; Beaulieu et al., 2007)

Definitions:

Quality of Evidence*

- I. Evidence from ≥ 1 properly randomized, controlled trial
- II. Evidence from ≥ 1 well-designed clinical trial without randomization, from cohort or case-controlled analytic studies (preferably from >1 center), from multiple time-series studies, or from dramatic results of uncontrolled experiments
- III. Evidence from opinions of respected authorities based on clinical experience, descriptive studies, or reports of expert committees

Strength of Recommendation*

- A. Good evidence to support a recommendation for use
- B. Moderate evidence to support a recommendation for use
- C. Poor evidence to support a recommendation

*Adapted from the Canadian Task Force on the Periodic Health Examination.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

[References open in a new window](#)

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

The recommendations in this guideline are largely based on previously published healthcare-associated infection (HAI) prevention guidelines available from a number of organizations, including the Healthcare Infection Control Practices Advisory Committee and the Centers for Disease Control and Prevention, Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), and the Association for Professionals in Infection Control and Epidemiology, and relevant literature published after these guidelines.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Improved strategies to prevent *Clostridium difficile* infection (CDI) in acute care hospitals

POTENTIAL HARMS

Sodium hypochlorite (bleach) can be corrosive and irritating to patients, housekeeping staff, and other healthcare personnel.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

Recommendations that might ordinarily be included in a guideline with a C-level strength of recommendation were excluded from the recommendations and are discussed in the "unresolved issues" sections (see original guideline document); this was done to help hospitals to focus their implementation efforts on the most strongly recommended prevention practices. Hospitals can prioritize their efforts by initially focusing on implementation of the prevention approaches listed as basic practices recommended for all acute care hospitals. If healthcare-associated infection (HAI) surveillance or other risk assessments suggest that there is ongoing transmission despite implementation of basic practices, hospitals should then consider adopting some or all of the prevention approaches listed under the "special approaches" section of this document. These can be implemented within specific locations or patient populations or can be implemented hospital wide,

depending on outcome data, risk assessment, and/ or local requirements. Most of the special approaches listed in this document are supported by studies based on the control of HAI outbreaks and require additional personnel and financial resources for implementation.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Audit Criteria/Indicators
Foreign Language Translations
Patient Resources

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Dubberke ER, Gerding DN, Classen D, Arias KM, Podgorny K, Anderson DJ, Burstin H, Calfee DP, Coffin SE, Fraser V, Griffin FA, Gross P, Kaye KS, Klompas M, Lo E, Marschall J, Mermel LA, Nicolle L, Pegues DA, Perl TM, Saint S, Salgado CD, Weinstein RA, Wise R, Yokoe DS. Strategies to prevent Clostridium difficile infections in acute care hospitals. Infect Control Hosp Epidemiol 2008 Oct;29 Suppl 1:S81-92. [PubMed](#)

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2008 Oct

GUIDELINE DEVELOPER(S)

Infectious Diseases Society of America - Medical Specialty Society
Society for Healthcare Epidemiology of America - Professional Association

SOURCE(S) OF FUNDING

Society for Healthcare Epidemiology of America (SHEA)/Infectious Diseases
Society of America (IDSA)

GUIDELINE COMMITTEE

Healthcare-Associated Infections Task Force

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

All members of the Healthcare-Associated Infections (HAI) Allied Task Force and the external peer reviewers complied with the Infectious Diseases Society of America (IDSA) policy on conflicts of interest, which requires disclosure of any financial or other interest within the past 2 years that might be construed as constituting an actual, potential, or apparent conflict. Members of the HAI Allied Task Force and the external reviewers were provided with the IDSA conflicts of interest disclosure statement and were asked to identify ties to companies developing products that might be affected by promulgation of the compendium. Information was requested regarding employment, consultancies, stock ownership, honoraria, research funding, expert testimony, and membership on company advisory committees. The task force made decisions on a case-by-case basis as to whether an individual's role should be limited as a result of a conflict.

D.S.Y. has received a research grant from Sage Products. L.A.M. has received research grants from and served as a consultant to 3M, Angiotech, and Cadence and is a consultant to Ash Access Technology. D.J.A. has received a research grant from Pfizer and has served on advisory councils for Schering-Plough and Pfizer. K.M.A. is the immediate past president of the Association for Professionals in Infection Control and Epidemiology and serves on its board of directors. H.B.'s participation does not represent official endorsement of the compendium by the National Quality Forum. D.P.C. is a member of the speakers' bureau for Enturia. S.E.C. has received a research grant from Merck. E.R.D. is a member of the speakers' bureaus for Elan, Enzon, Schering-Plough, Viropharma, Pfizer, and Astellas and serves on the advisory boards of Schering-Plough, Genzyme, and Salix. V.F. is the past president of the Society for Healthcare Epidemiology of America, has been a consultant to Steris, Verimetrix, and Merck, and is a member of the speakers' bureaus for Cubist and Merck. P.G. has received a research grant

from Becton, Dickinson and Company (BD); has been on the speakers' bureau for Ortho-McNeil; and served on the Zostervax advisory board of Merck. K.S.K has received research grants from Pfizer, Merck, and Cubist; is a member of the speakers' bureaus for Pfizer, Merck, Cubist, Schering-Plough, and Wyeth; and serves on the advisory board for Schering- Plough. J.M. has received a research grant from the Swiss National Science Foundation. T.M.P. is a past president of the Society for Healthcare Epidemiology of America; is on the advisory board or the speakers' bureau for Theradoc, 3M, Replydine, and Ortho-McNeil; and has received honoraria from VHA and the Institute for Healthcare Improvement. S.S. has received an honorarium from VHA. C.D.S. is a member of the speakers' bureau for Pfizer. R.A.W. has received research grants from Sage Products and the Centers for Disease Control and Prevention and has been a consultant on Tolevamer for Genzyme and a consultant to the Centers for Disease Control and Prevention. D.C. is co-chair of the National Quality Forum Patient Safety Taxonomy Committee and an employee of CSC, a healthcare technology consulting company, and has ownership in Theradoc, a medical software company. All other authors report no relevant conflicts of interest.

ENDORSER(S)

American Organization of Nurse Executives - Professional Association
Association for Respiratory Care - Professional Association
Infusion Nurses Society - Professional Association
Pediatric Infectious Diseases Society - Professional Association
Society for Hospital Medicine - Professional Association
Society of Critical Care Medicine - Professional Association
Surgical Infection Society - Professional Association

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available from the [Society for Healthcare Epidemiology of America \(SHEA\) Web site](#).

Print copies: Available from the Reprints Coordinator, University of Chicago Press, 1427 E. 60th St., Chicago, IL 60637 (reprints@press.uchicago.edu) or contact the journal office (iche@press.uchicago.edu).

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Improving patient safety through infection control: a new healthcare imperative. *Infect Control Hosp Epidemiol* 2008;29:S3-S11. Electronic copies: Available from the [Society for Healthcare Epidemiology of America \(SHEA\) Web site](#).
- A compendium of strategies to prevent healthcare-associated infections in acute care hospitals. Executive summary. *Infect Control Hosp Epidemiol*

2008;29:S12–S21. Electronic copies: Available from the [Society for Healthcare Epidemiology of America \(SHEA\) Web site](#).

Print copies: Available from the Reprints Coordinator, University of Chicago Press, 1427 E. 60th St., Chicago, IL 60637 (reprints@press.uchicago.edu) or contact the journal office (iche@press.uchicago.edu).

Performance measures and a urinary catheter reminder form (in appendix) are available in the [original guideline document](#).

PATIENT RESOURCES

The following is available:

- FAQs (frequently asked questions) about Clostridium difficile infections. 2008. 1 p.

Electronic copies: Available in English and Spanish from the [Society for Healthcare Epidemiology of America \(SHEA\) Web site](#).

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

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