Inappropriate Testing for *Clostridioides difficile* in Long-Term Care: Implications Highlight the Need for an Algorithm

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Abstract
This article provides clear guidance related to appropriate testing for *Clostridioides difficile* (*C. diff*) and identifies the negative implications of inappropriate testing, repeat testing, and testing for cure. Residents of long-term care (LTC) facilities are at increased risk for developing *C. diff*. Complications can arise if a resident does not have an active *C. diff* infection (colonization) and has a positive *C. diff* laboratory test result. The authors share a fictional bedside story illustrating the negative consequences that can result from inappropriate *C. diff* testing, and present an algorithm that promotes mindful application of testing, which may result in cost savings and prevent adverse resident outcomes.

**Keywords:** *C. diff, long-term care, test, diarrhea, stool, algorithm, treatment, diagnosis*

Bedside Story
Sherry was a 68-year-old mother of two and grandmother of five very active grandchildren. She was retired and a widow of two years, and she babysat her grandchildren in her free time. She also played the piano at her church, where she led the women’s missionary committee. Following her retirement, she and her best friend Donna saw each other every day. They gardened, walked for exercise, and traveled the world.

After falling on the ice while leaving church, Sherry was admitted to the hospital with a fractured right hip and right clavicle. She developed pneumonia during her hospitalization, was started on antibiotics, and became weak. She was transferred from the hospital to Cedar Springs, a LTC facility, for rehabilitation services. Sherry was frustrated about being unable to care for herself and was eager to recover so she could go home and resume her normal activities. Her children, grandchildren, and Donna had been visiting her at the hospital and promised to continue visiting at the LTC facility.

During her first 24 hours at Cedar Springs, Sherry had one liquid stool. The aide reported this finding to an RN, who in turn reported it to the physician on-call. The physician ordered a *Clostridioides difficile* (*C. diff*) test, and the staff initiated contact precautions and moved Sherry to a private room. The laboratory processed the *C. diff* specimen, which showed a positive result, so antibiotics were prescribed for treatment. Over the following two weeks, Sherry had only one bowel movement per day, ranging from unformed to soft.

While in isolation, Sherry was unable to participate...
in group activities, interacted less with healthcare staff, and and received physical therapy in her room. Visits from her children, grandchildren, and Donna decreased significantly. Sherry had been an active person who enjoyed spending time with others—going on trips, babysitting, and participating in church activities. Following her *C. diff* diagnosis, she became increasingly depressed, slept more, and lost motivation to exercise and actively engage in physical therapy. She had no appetite, lost 15 pounds, and developed a pressure injury on her sacrum.

Several weeks after her *C. diff* diagnosis, Sherry tried to get out of bed by herself to go to the bathroom. Due to her weakened condition, she fell and hit her head. A nurse found Sherry unconscious and called 911. Sherry was admitted to the hospital and found to have a subdural hematoma.

Unfortunately, Sherry passed away two days later.

**Introduction**

The bacteria *Clostridioides difficile* (*C. diff*) is a significant health threat which can lead to diarrhea, colitis, and even death. In 2017, *C. diff* caused nearly half a million infections among people in the United States, more than 100,000 of whom were residents in LTC facilities. Many risk factors contribute to the development of *C. diff* infection, including an age of 65 years and older, a weakened immune system, a history of previous *C. diff* infection, and recent hospitalization. Medications that suppress gastric acid production are also contributory factors.

A significant risk factor for developing *C. diff* infection is antibiotic use. Antibiotics can result in weeks to months of suppression of gut microbiota bacteria that defend against infection. When "good" gut bacteria are suppressed, there is an increased risk of becoming infected from ingesting the *C. diff* spore through contact with another person or a contaminated surface.

Residents of LTC facilities are at increased risk for developing a *C. diff* infection. For this reason, they may also be subject to overtesting. Testing for *C. diff* outside of the recommended guidelines—such as testing of asymptomatic residents—can result in overdiagnosis and overtreatment. Inappropriate testing can lead to increased costs and implications for residents stemming from contact isolation and unnecessary antibiotics.

In 2010, a joint expert panel appointed by the Infectious Diseases Society of America (IDSA) and the Society for Healthcare Epidemiology of America (SHEA) provided guidelines to improve the diagnosis and management of *C. diff* infection in adults. In 2017, IDSA and SHEA issued updated guidelines containing significant changes in the recommended management of *C. diff* infection and best practices for diagnosis.

**Challenges Facing LTC Facilities**

In recent months, infection prevention experts at the Patient Safety Authority (PSA) have received many questions from infection prevention designees and other leaders from Pennsylvania long-term care facilities related to *C. diff* testing. These questions concern whether residents should be screened for *C. diff* on admission to rule out infection, if a specimen should be sent at the first sign of a liquid stool to rule out *C. diff*, and the nature of the difference between colonization and active infection. In light of the questions and subsequent conversations with facility representatives, there appears to be a knowledge deficit regarding the IDSA and SHEA guidelines.

**Disclaimer**

Sherry’s story is a composite of cases from the authors’ professional nursing experiences. Adverse outcomes were fictionalized according to research related to the implications of contact isolation, and Sherry, Donna, and the nursing facility Cedar Springs are fictitious. The algorithm depicted in Figure 1 is based on 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); however, the algorithm does not reflect these guidelines verbatim.
Testing and Treatment Implications

While antibiotic therapy and contact precautions are indicated for active *C. diff* infection, asymptomatic colonization of *C. diff* does not require treatment. The adverse effects of treatment and isolation can harm residents who are tested outside the recommended guidelines. Antibiotics can disrupt the normal bacterial flora of the intestine. Normal bacterial flora is important, as it assists with the breakdown and absorption of food nutrients, metabolizes medication, and protects against harmful bacteria. Oral vancomycin, often used in treating *C. diff*, may allow production of vancomycin-resistant enterococci (VRE), which can make future treatment difficult. Contact precautions, which are intended to prevent and reduce transmission of organisms throughout the facility and from person to person, can have a negative impact on facilities and residents.

Contact precautions can be costly for LTC facilities. They require personal protective equipment—e.g., gown and gloves—each time someone enters the room. This results in direct costs for the materials, as well as labor time for healthcare workers donning and doffing their gear. Additional costs are associated with a private room, including the inability to place another resident not infected with *C. diff* in the same room. If an isolation room or private room is not available, a resident may need to be transferred to another facility.

Contact precautions also can have detrimental effects on residents. In their systematic review of the literature based on research performed in inpatient settings, Morgan and colleagues identified many adverse outcomes related to contact precautions, including a twofold increase in falls, pressure injuries, and fluid and electrolyte imbalances. Contact precautions were associated with fewer resident-healthcare worker interactions and fewer visits from friends and family members. Isolated residents were more likely to feel bored and socially isolated, resulting in depression, anxiety, and anger. In another study, the observations of healthcare workers made during contact precautions in skilled nursing facilities identified potentially harmful consequences, such as confusion, depression, and a decrease in self-esteem.

Avoiding Overtesting

Asymptomatic *C. diff* colonization is common among residents of LTC facilities. Therefore, it is imperative that testing be performed in accordance with recommended guidelines to avoid overdiagnosis and overtreatment. Recent studies have shown that mindful application of testing guidelines can save money, prevent overtesting, and decrease *C. diff* infections.

Parada and colleagues conducted a study to review *C. diff* order appropriateness. The study was conducted during a six-month trial by a 10-person team, based on an algorithm guideline for testing. Review of 678 *C. diff* orders showed that 428 (63.1%) were approved and 250 (36.9%) were rejected. A mandatory review was performed on all *C. diff* testing orders. Orders that correlated with the algorithm were approved. Orders that did not correlate with the algorithm were rejected and communicated to the care team. Appeals to the rejection of testing could be made on a case-by-case basis to the medical director of infection control. This study also included early identification of community-acquired *C. diff* to quickly initiate contact isolation and prevent diagnosis being classified as hospital-acquired. As a result of the study, the facility saved approximately $15,000 in laboratory testing costs, avoided overdiagnosing colonized patients as having *C. diff* infection, and achieved a significant drop in their infection numbers.

In another study, a hospital revised its in-house *C. diff* testing guidelines to correlate with the 2017 IDSA/SHEA guidelines. The facility changed documentation requirements to help providers test more appropriately, limited testing to patients with three or more unformed stools per day, and excluded testing within 24 hours of laxative use. The laboratory also rejected specimens sent within seven days of previous negative results. *C. diff* testing decreased by 47%, from 358 to 188 tests per month. The number of *C. diff* infections decreased by 39% in one year (from 141 to 83). The facility also targeted improvements in hand hygiene, antimicrobial stewardship, and cleaning and disinfection of the facility. By revising the guidelines and documentation requirements, *C. diff* cases and overdiagnosis decreased.

Although these studies were conducted in a hospital setting, similar outcomes may be achieved in LTC facilities by using an algorithm and testing in accordance with guidelines.

Improving *C. Diff* diagnosis

LTC facilities can decrease overdiagnosis of *C. diff*—and the various implications for residents and
facilities—by implementing strategies from the 2017 IDSA/SHEA clinical practice guidelines for *C. diff* infection.6

1. Understand that the preferred population for *C. diff* testing is residents with unexplained liquid stool (diarrhea) and new onset of three or more liquid stools (diarrhea) in 24 hours. Conditions and circumstances commonly associated with diarrhea include irritable bowel syndrome, recent laxative use, and therapies such as enteral tube feedings and intensive chemotherapy. Consider testing for *C. diff* if a resident has diarrheal symptoms not clearly attributable to these underlying conditions (i.e., unexplained).

2. Align policies with the guidelines and educate all members of the care team, including physicians, advanced practice providers, nurses, aides, and other allied health professionals.
   a. Follow guidelines for testing residents with a new onset of three or more unformed liquid stools (diarrhea) in 24 hours that are not otherwise explained by a condition or treatment that could cause diarrhea.
   b. Only submit a specimen that is liquid stool (diarrhea) and takes the shape of a container.
   c. Educate nurses and aides regarding the definitions of key terms, including “unformed liquid stool,” “unexplained stool,” and “new onset.”
   d. Teach about contraindications for testing, such as laxatives. Staff may be unfamiliar with the brand and generic names of laxatives, so provide examples.

3. Do not screen for *C. diff*. There is insufficient data to recommend screening and contact precautions for asymptomatic carriers.

4. Define clinical symptoms that a resident may experience during a *C. diff* infection, such as leukocytosis or abdominal pain. In some cases, residents could experience fulminant *C. diff* (severe/complicated) showing signs of hypotension, shock, ileus, or megacolon.

5. Use a supportive decision-making tool, such as the algorithm for appropriate testing of *C. diff* in Figure 1, before collecting a specimen for *C. diff*.

6. If possible, develop a relationship with the laboratory to distinguish testing methods. Senior leadership may need to be involved in collaboration efforts. Develop a hard-stop protocol to reject specimens that have been tested during the same episode of diarrhea (within seven days), and do not test stool from asymptomatic residents, except for epidemiological studies such as during an outbreak.

7. During the same episode of diarrhea, do not repeat testing (within seven days).

8. Residents should not be tested to determine if their *C. diff* infection has been cured. Testing should only be performed as described above.

**Reflection on the Bedside Story**

Following Sherry’s death, her family and friends were overcome with grief. They could not understand how someone who was once was so active and full of life could be gone so quickly.

Cedar Springs performed a root cause analysis related to Sherry’s fall. During chart review, they discovered that Sherry did not meet the testing criteria of unexplained liquid stool (diarrhea) and new onset of three or more liquid stools in 24 hours—she had only one liquid stool in 24 hours. She also had laxative tablets that day, which may have contributed to the liquid stool. If the IDSA/SHEA clinical practice guidelines had been followed, Sherry’s story could have ended very differently, with her returning home to enjoy retired life with her friends and family.

**Conclusion**

As illustrated by Sherry’s case, the significant implications of unnecessary *C. diff* testing are avoidable. By using the algorithm for appropriate testing of *C. diff* and applying the strategies outlined in this article, LTC facilities can ensure *C. diff* testing is performed according to best practices, thereby avoiding unnecessary costs and, potentially, preventable adverse patient outcomes.
Figure 1. Appropriate Testing of *Clostridioides difficile*

**References**


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**BEDSIDE STORY**

![Figure 1](https://example.com/figure1.png)

*On rare occasion, residents may experience fulminant *C. diff* (severe/complicated) showing signs of hypotension, shock, ileus, or megacolon. Clinical judgment is advised.

**KEY CONSIDERATIONS**

- Do not screen residents for *C. diff*. Testing in the absence of a new onset of 3 or more unformed stools in 24 hours is not recommended.
- Do not perform repeat testing during the same episode of diarrhea (within 7 days).
- Do not test stool from asymptomatic residents.
Does the resident have a condition or treatment that would explain the unformed stools, such as irritable bowel syndrome, enteral tube feedings, or intensive chemotherapy?

No

Are the unformed stools attributable to the condition/treatment?

No

Yes

Yes

Testing Inappropriate

Testing Appropriate

This algorithm is based on but does not reflect verbatim the IDSA/SHEA 2017 clinical practice guidelines for C. diff infection.


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