**One Minute Guide for *Clostridium difficile* Testing**

**Q:** Should I send stool for *C. difficile* testing for all my inpatients with diarrhea? Should I retest within 7 days if the first test is negative, and should I send a test for cure?

**The Bottom Line:** NO!

- Don't test your patient for *C. diff* if they had < 3 unformed stools in the past day.
- Don't test patients who received laxatives within the past 48 hours.
- Don't retest within 7 days.
- Don't test for cure.

Hospitalized patients could have multiple reasons for loose stools. *C. diff* commonly colonizes the colon and a positive test may not mean that *C. diff.* is the cause of diarrhea. By following these simple rules, up to 30% of low-risk patients would not be tested[1] which translates into decreased hospital costs and prevents unnecessary treatment.

**Context:** Diarrhea is common in the hospitalized patient.[1] Physicians frequently reflexively test for *C. diff* when diarrhea is present; however, the majority of cases of diarrhea are due to medications, underlying illnesses and enteral feeding. Antibiotic-associated diarrhea is common, but only 20% of cases are caused by *C. diff toxin*.[2] Many patients are unnecessarily tested for *C. diff* when they do not have any diarrhea or signs and symptoms of C. *diff* disease.

**Table 1**
**Asymptomatic carriage and CDI on hospital admission versus acquired during hospitalization**

| Setting | Medical Ward, n (%) | Medical-Surgical Ward, n (%) | 3 ICUs/2 Medical-Surgical Wards, n (%) | 2 Medical Wards, n (%) | 6 Hospitals, n (%) | Medical Wards, n (%) |
|---|---|---|---|---|---|---|
| *C difficile* positive on admission | 29 of 428 (7) | 65 of 634 (10)[a] | 55 of 496 (11)[b] | 37 of 271 (14) | — | 16 of 168 (10)[c] |
| Asymptomatic carriage | 17 of 29 (59) | 61 of 65 (94) | 44 of 55 (80)[d] | 19 of 37 (51)[e] | 184 of 4143 (4) | 16 of 168 (10 |
| CDI | 12 of 29 (41) | 4 of 65 (6) | 11 of 55 (20) | 18 of 37 (49) | [f] | Excluded |
| *C difficile* acquired during hospital stay | 83 of 399 (21) | 54 of 569 (10) | 34 of 234 (15)[g] | 47 of 253 (19) | 240 of 3959 (6) | 12 of 152 (8) |
| Asymptomatic carriage | 52 of 83 (63) | 51 of 54 (94) | 25 of 34 (74) | 19 of 47 (40) | 123 of 240 (51) | 8 of 12 (75) |
| CDI | 31 of 83 (37) | 3 of 54 (6) | 9 of 34 (26) | 28 of 47 (60) | 117 of 240 (49) | 4 of 12 (25) |
| Persistence of carriage | 68 of 83 (82) colonized on discharge[h] | — | 44 of 71 (62) colonized on follow-up cultures | — | — | — |

*Abbreviation:* ICU, intensive care unit.
[a] Includes toxigenic and nontoxigenic strains.
[b] Includes 406 subjects with initial culture within 72 hours of admission and 90 with initial culture greater than 72 hours after admission.
[c] Only toxigenic strains included based on real-time polymerase chain reaction and culture.
[d] Twenty-four of 44 (55%) toxigenic.
[e] Cytotoxin activity was detected in stools of 15 of 19 (79%) asymptomatic carriers and 3 of 4 with negative cytotoxin activity carried nontoxigenic strains.
[f] Seventy-five patients either developed CDI within 3 days of admission (n = 60) or were asymptomatically colonized on admission and subsequently developed CDI (n = 15).
[g] Nineteen of 34 (56%) toxigenic with 10 remaining asymptomatic and 9 developing CDI.
[h] Includes both asymptomatic carriers and patients with CDI.

**The Data:** Asymptomatic colonization of patients with *C. diff* is increasing.[3] Treatment of colonized patients results in unnecessary antibiotic administration, rising hospitalization costs and poor quality metrics for the hospital. Prevalence of *C. diff* colonization of patients on hospital admission ranges between 7-18%. Acquisition during hospitalization is also rising and is estimated to be between 6-21%. Some studies estimate that 50% of patients hospitalized longer than one month develop colonization, and most will be asymptomatic.[3] (Table 1)

*C. diff* PCR is a highly sensitive test (90%).[4] In fact, it is so sensitive that it may be positive and detect the *C. diff* toxin gene even when the gene is not actively producing toxin. This results in many patients who have a positive test and do not have *C. diff* infection; i.e. a low positive predictive value for *C diff* infection (50-70%).[5] Positive predictive value increases when the C. *diff* test is used among patients with a higher prevalence for *C. diff* infection, such as patients with 3 or more liquid stools per day who have not received laxatives within the past 48 hours.
There is little value of repeat *C. diff* testing; only 1.7% of people with a negative test have a positive test within 7 days and repeat testing can increase the number of false positive results.[6]

Repeat stool testing for test of cure is NOT recommended.[7] Up to 50% of patients have positive *C diff* PCR for as long as six weeks after the completion of therapy.[8] Therefore, signs and symptoms rather than repeat testing should be used to assess whether a patient has responded to therapy for C. *diff*.

**Conclusion:** High rates of *C. diff* colonization of the colon exist in hospitalized patients. Over-testing among patients without signs and symptoms of C. *diff* infection can lead to false positive results. Test only those patients who are symptomatic with ≥3 loose stools per day and who have not been exposed to laxatives within 48 hours. Retesting within 7 days of a negative test is usually not clinically indicated. Do not test for cure.

**References:**


1. Katz, David A., et al. "Predicting Clostridium difficile stool cytotoxin results in hospitalized patients with diarrhea." *Journal of general internal medicine* 12.1 (1997): 57-62.
2. Polage, Christopher R., Jay V. Solnick, and Stuart H. Cohen. "Nosocomial diarrhea: evaluation and treatment of causes other than Clostridium difficile." *Clinical infectious diseases*55.7 (2012): 982-989.
3. Donskey, Curtis J., Sirisha Kundrapu, and Abhishek Deshpande. "Colonization versus carriage of Clostridium difficile." *Infectious Disease Clinics* 29.1 (2015): 13-28.
4. Deshpande, Abhishek, et al. "Diagnostic accuracy of real-time polymerase chain reaction in detection of Clostridium difficile in the stool samples of patients with suspected Clostridium difficile infection: a meta-analysis." *Clinical Infectious Diseases*53.7 (2011): e81-e90.
5. Buckel, Whitney R., et al. "Gut check: Clostridium difficile testing and treatment in the molecular testing era." *infection control & hospital epidemiology* 36.2 (2015): 217-221.
6. Aichinger, Elisabeth, et al. "Nonutility of repeat laboratory testing for detection of Clostridium difficile by use of PCR or enzyme immunoassay." *Journal of clinical microbiology* 46.11 (2008): 3795-3797.
7. Cohen, Stuart H., 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)." *Infection Control & Hospital Epidemiology* 31.5 (2010): 431-455.
8. Fekety, Robert, et al. "Treatment of antibiotic-associated Clostridium difficile colitis with oral vancomycin: comparison of two dosage regimens." *The American journal of medicine* 86.1 (1989): 15-19.