Survey on *Clostridium difficile* Testing Practices: No One-Size-Fits-All Solution

Bureau of Laboratories

In February, MDCH BOL surveyed the clinical laboratories in Michigan on their *C. difficile* testing practices. Here is a summary of the findings.

C. difficile LAB SURVEY - QUICK STATS
Percentage of labs who responded (N=54)

Use kits that detect *C. difficile* Toxins A and B	89%
Use kits that detect GDH antigen	13%
Use molecular assays	9%
Tesing is available on more than one shift	52%
Reject formed stools	48%
Reject stools if delayed or not kept cold	54%
Limit the number or frequency of repeat tests on patients	48%

Larger hospitals are more likely than smaller hospitals to limit repeat testing for *C. difficile* (P=0.011)

No other significant differences were noted between smaller and larger hospital testing practices.

Background

One of the 2010 National Patient Safety Goals (7.03.01) from The Joint Commission requires hospitals to "Implement evidence-based practices to prevent healthcare-associated infections due to multi-drug resistant organisms" ……[including but] "not limited to epidemiologically important organisms such as… *Clostridium difficile* (CDI)…"

The Department of Health and Human Services also names *Clostridium difficile* infections (CDI) as one of 7 Healthcare-Associated Infections (HAI) prevention targets, with a goal to reduce the case rate per patient days by 30% in the next five years.[1] Meeting these goals will involve surveillance and the determination of existing (baseline) rates of *C. difficile* infection. MDCH Bureau of Epidemiology received funding through the American Recovery and Reinvestment Act, and is actively working with several hospitals in the Michigan HAI Surveillance and Prevention Plan project. One component of the project will track the rates of *C. difficile* infections in Michigan. See the webpage http://www.michigan.gov/hai for more information on the HAI Prevention Plan.

Recognizing that laboratory testing is essential for both diagnosis and surveillance of CDI, we surveyed hospital laboratories to determine the current CDI testing practices in Michigan.

Methods

An online survey of managers from 135 laboratories was conducted between Feb. 8 and March 10, 2010. Sixty-eight complete responses were received (a 50% rate of response).

Fifty-four laboratories responded when asked which kits were used for *C. difficile* testing (the remaining 14 did not perform testing in-house).The results are summarized in Table 1.

The majority of Michigan laboratories (48/54, 89% in our survey) use either solid phase or membrane-based rapid enzyme immunoassay (EIA) kits that detect *C. difficile* toxin A and/or B. Recent studies have suggested that rapid toxin-based EIAs for detecting CDI are less sensitive than previously reported.[2,3] Seven laboratories are using GDH (glutamate dehydrogenase) antigen screening tests, which some studies have shown to be sensitive as a screening test. The rapid GDH test has low specificity, however; and specimens which are positive with the GDH antigen screening should be tested by a second method to increase the likelihood that a positive result indicates true CDI.[2] This is known as 2-stage testing. Five laboratories (9%) are validating or have already begun using molecular assays.

Current recommendations from the Society for Healthcare Epidemiology of America and the Infectious Disease Society of America (SHEA/IDSA), as well as those from the Association for Professionals in Infection Control and Epidemiology (APIC) and others (CDC Toolkit) all recommend testing of diarrheal stools only (i.e., symptomatic patients), as a routine lab policy (with exceptions for very specific clinical presentations e.g., ileus).[4,5,6]

We asked whether laboratories had policies to reject formed stools for *C. difficile* testing. Twenty-six of 54 laboratories (48%) have such policies, and 21 of them define a diarrheal stool as one that "conforms to shape of container." Twenty-eight laboratories do not have policies to reject formed stool for *C. difficile* testing.

Other key findings

Twenty-six (48%) limit the number and/or frequency of specimens on a patient.

SHEA/IDSA and APIC do not support routine repeat testing (defined as a repeat test during the same episode of diarrhea).[4,5] The surveillance toolkit suggests an "expert consult" for repeat testing ordered within 5 days.[6] False positives may increase because of the lower prevalence of disease in the population of patients who have had a prior negative test; and although widely practiced, repeat testing may be of little value.[7,8]

***C. difficile* testing is readily available.**

Nineteen laboratories (35%) test specimens as they are received, 27 (50%) test in batch runs, and 8 (15%) use a combination of both practices. Eighty-seven percent of the laboratories (47 labs) provide testing 7 days a week, including holidays. More than half (52%) perform testing on two or more shifts; and 48% test only on one shift daily.

Specimen acceptance policies vary.

Laboratories vary in the specifics, but a majority (54%) do have written policies to reject a specimen when the time between collection and delivery to the lab exceeds a specified limit, and/or if the specimen has not been kept cold. Although the spores formed by *C. difficile* are persistent, the toxin produced by the organism is heat-labile; toxin degradation may affect results if testing is not performed as soon as possible. Several labs commented on the difficulty of timely specimen collection and transport, especially from outpatients.

We wondered whether larger hospitals had different testing practices than smaller hospitals. When comparing hospitals with fewer than 250 beds with those having more than 250 beds, we found no significant differences in practices for testing formed stools ($P = 0.163$) or delayed stools ($P=0.891$). However, larger hospitals were more likely to limit the amount of repeat testing performed ($P=0.011$).

As we move forward with the Michigan HAI Surveillance and Prevention Plan for *C. difficile* infection, it will be essential to understand how testing is performed in our state. We thank all the laboratories who provided their data in our survey. We also thank Dr. Barbara Robinson-Dunn for her assistance with the survey design.

Table 1

C. difficile TOXIN TESTS (48 labs)	Number of Labs *
Meridian ImmunoCard Toxin A+B	25
Meridian Premier Toxin A&B EIA	6
Remel Xpect *C. difficile* Toxin A/B	5
TechLab/Wampole TOX A/B II	5
TechLab/Wampole Toxin A/B QUIK CHEK	4
BioMerieux VIDAS/miniVIDAS	2
BD ColorPac Toxin A	1
GDH ANTIGEN TESTS (7 labs)	
TechLab/Wampole *C. diff* QUIK CHEK	2
TechLab/Wampole *C. diff* QUIK CHEK COMPLETE	5
MOLECULAR / OTHER (5 labs)	
Cepheid GeneXpert *C. difficile*	2
BD GeneOhm *C. diff*	2
Anaerobic culture for organism	1

* Total number >54 because 6 labs reported using more than one method

Survey Participant Comments

- We are looking at the *C. DIFF* COMPLETE assay.
- If MDCH has recommendations regarding this test, I am interested to hear (read) them.
- Will be looking to transition to PCR testing for *C. diff* toxin (commented multiple times).
- We will run "Stat" *C. diffs* if requested verbally.
- Infection Control investigates positive patients. Also, have set comments when we receive repeat specimens on negatives or positives approved by ID.
- What are the standards for *C. diff* testing? ex. how many tests should be done for a patient? Do you test on formed stools?
- What is meant by 2-stage testing?? (Commented multiple times).
- Our client hospitals use the rapid EIA tests and our microplate EIA testing volume dropped to very low levels. Cytotoxin testing dropped after that and we now sent them out.
- If we receive outpatient stools for *C diff* they may be older than we like, but we do them stat on in-house stools.
- The testing requested is for *C. difficile* toxin A&B, not direct culture for *C. difficile*.
- Patients are tested for *C. diff* antigen first. If positive, toxin A&B testing is performed.
- We are evaluating a *C. diff* assay at the moment. (Commented multiple times).

Current Recommendations

Current recommendations: 1) test diarrheal stools only (i.e., symptomatic patients); 2) define a diarrheal stool as one that conforms to the shape of the container; 3) routine repeat testing is not recommended (during the same episode of diarrhea); 4) EIA should not be used as a stand alone test; 5) positive GDH require confirmation; 6) NAAT can be used as a stand alone test; and 7) testing of neonates is not recommended.

Evaluations of new assays

More researchers are using toxigenic culture as the new "gold standard" when evaluating new assays.

References

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