Diagnostic Stewardship Interventions for *Clostridioides difficile* (C. difficile) Infection

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Objectives

• Describe difference between hospital onset *C. difficile* and clinical syndrome of *C. difficile*

• Describe how colonization (not infection) of *C. difficile* can result in a positive test

• Identify diagnostic stewardship interventions for *C. difficile* testing
Hospital Onset *C. difficile* Infection Criteria

1. **Positive lab test*** greater than 3 days after admission

2. Greater than 8 weeks since most recent positive test

*This is not a clinical diagnosis*
Hospital onset *C. difficile* impacts hospital ratings

Hospital Compare data, 2019
The presence of *C. difficile* is not equivalent to an active *C. difficile* infection

The presence of *C. difficile* **toxin** is necessary for active infection to exist
As of now, it is NOT standard of care to treat someone who does not have the syndrome of infection (i.e. treatment of colonization).
C. difficile colonization can result in positive C. difficile test even when infection is not present
*C. difficile* colonization can result in positive *C. difficile* test even when infection is not present.
Liquid stool sent to lab

GDH Antigen | Toxin A/B
---|---
+ | +

Both tests positive
Positive for toxigenic *C. difficile*
Treat Patient

GDH Antigen | Toxin A/B
---|---
- | -

Both tests negative
Negative for toxigenic *C. difficile*
Do Not Treat Patient

GDH Antigen | Toxin A/B
---|---
+/- | -/+_

Mixed results on EIA testing
Automatically sent for PCR (NAAT)

PCR (NAAT) Positive:
Positive for toxigenic *C. difficile*
Treat Patient

PCR (NAAT) Negative:
Negative for toxigenic *C. difficile*
Do Not Treat Patient

GDH = glutamate dehydrogenase
NAAT = nucleic acid amplification test
Inappropriate *C. difficile* Testing at UNM

- Present on Arrival (13 cases, 15.3%)
- Repeat Testing (7 cases, 8.2%)
- Laxative Administered within 48 hours of Specimen Collection (32 cases, 37.6%)
- Appropriate Test Per Review Criteria (33 cases, 38.8%)

Cases of HO-CDI
Bundled Intervention to Reduce C. difficile

- Diagnostic Stewardship
- Infection Control
- Antimicrobial Stewardship
Bundled Intervention to Reduce *C. difficile*

- **Diagnostic Stewardship**
- Infection Control
- Antimicrobial Stewardship
Diagnostic Stewardship: Intervention #1

• Clinical Decision-aid Tool ("pilot")
  • Implemented on selected nursing units
  • Providers and nurses educated
  • Provided recommendation, did not preclude testing
**PROVIDER QUESTIONS**

- Has your patient had 3 or more loose stools in the last 24 hours?
  - Yes
  - No → STOP Cdiff testing NOT recommended. (Unless concern for toxic megacolon/ileus)

- Has your patient received laxatives within the last 48h?
  - Yes → STOP Cdiff testing NOT recommended. (Can consider holding laxatives)
  - No

- Does your patient have at least one of the following?
  - Fever
  - Leukocytosis
  - Cramping
  - Lower abdominal pain
  - Abdominal distention
  - None → STOP Cdiff testing NOT recommended, first assess for alternative causes of diarrhea.

- Has your patient been tested within the last 7 days and been negative for Cdiff?
  - Yes → STOP Cdiff testing NOT recommended.
  - No

**NURSE QUESTIONS**

- Has your patient had 3 or more loose stools in the last 24 hours?
  - Yes
  - No → STOP Cdiff testing NOT recommended. (Unless concern for toxic megacolon/ileus)

- Has your patient received laxatives within the last 48h?
  - Yes → STOP Cdiff testing NOT recommended.
  - No

- Cdiff testing recommended (provider to place order, nurse will collect)
- Cdiff testing NOT recommended and NOT ordered
- Cdiff testing NOT recommended, provider disagrees, testing ordered (provider to place order and provide reason below, nurse will collect)
Diagnostic Stewardship: Intervention #2

• Electronic Medical Record (EMR) Hard Stop
  • *Can be bypassed* by paging hot seat pathology resident

• Automatically prevent testing order if at least one of the following was present:
  • Laxatives administered within last 24 hours
  • Processed *C. diff* test within last 7 days
EMR Hard Stop

- Patient on laxatives
  - Senna
  - Polyethylene glycol 3350
  - Lactulose
  - Bisacodyl

- ~ 9 hard stop calls
- 0 positive tests
Following the interventions total *C. difficile* tests ordered decreased ~30%
Hospital acquired *C. difficile* infections observed decreased

![Total Hospital Onset *C. difficile* Infections FY19-FY20](chart)

- **Dec**: Pilot forms
- **Jun**, **Aug**, **Oct**: Hard stop
Intensive Care Unit (ICU) *C. difficile* tests ordered decreased by ~ 50%
Hospital acquired *C. difficile* infections observed in ICU decreased

<table>
<thead>
<tr>
<th>Location</th>
<th>2018</th>
<th>2019</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>51</td>
<td>17</td>
<td>67% decrease</td>
</tr>
<tr>
<td>PCU</td>
<td>84</td>
<td>76</td>
<td>10% decrease</td>
</tr>
</tbody>
</table>
Hospital Onset \textit{C. difficile} SIR trends below National SIR

\begin{itemize}
\item National SIR (2018): 0.71
\item UNM SIR
\item 2017: 1.06, 1.10, 1.08, 1.23, 1.37
\item 2018: 1.16, 2.12, 1.65, 1.00, 1.22, 1.11
\item 2019: 0.69
\end{itemize}
Take Home Points

• Hospital onset *C. difficile* is not equivalent to clinical syndrome of *C. difficile*

• Positive *C. difficile* test can reflect colonization and not infection

• Diagnostic stewardship interventions may
  • Reduce number of *C. difficile* tests ordered
  • Associated with lower rates of hospital onset *C. difficile* infection
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