The Use Of a Nursing Screening Tool and a Clinical Decision Support Order in the Electronic Health Record to Reduce *Clostridium difficile* LabID Events.

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Conflict of Interest Disclosure

No real or conflicts of interest to report for:

• Michelle Charles MSN, RN or
• Karen Vallejo MSN, RN, CIC
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Objectives

• Describe the process for the development of a nursing screening tool for *Clostridium difficile (C. diff)* and Clinical Decision Support (CDS) order in the EHR.

• Discuss the workflow and the implementation process of the Emergency Department and inpatient screening tools in the EHR.

• Describe the Impact of the implementation of the screening tool and CDS ordering for *C. diff* and the reduction of inappropriate testing and LabID events.

• Discuss lessons learned from the implementation of *C. diff* initiative.

• Next Steps
What is *C. difficile*?

https://youtu.be/WNfFQI18ABI
All Hands on Deck
C. difficile Testing Guidelines

To facilitate enhanced diagnostic practices, the following guidelines are recommended:

*C. difficile* testing should only be performed on patients with clinically significant diarrhea defined as 3 or more loose or liquid stools that occur in a 24-hour period. Providers should ensure that the patient has not been administered laxatives in the prior 24-48 hours as a possible explanation of diarrheal symptoms. *C. difficile* testing should NOT be ordered on patients who have an ileostomy.

*C. difficile* testing is not recommended as part of a fever workup or evaluation of an elevated WBC unless there is accompanying diarrhea as defined above.

*C. difficile* testing should not be performed on formed or hard stool samples or on patients who have had a positive specimen within the preceding 21 days as the test may remain positive for months despite clinical response to treatment.

Due to the sensitivity of the PCR test only one specimen will be tested per seven days if it tests negative. When repeat testing is performed for CDI within a 7-day period, the pre-test probability for the second assay is so low that the ratio of true-positive results to false-positive results becomes very unfavorable; this could result in misdiagnosis for some patients.

To operationalize these guidelines, the laboratory will not perform a *C. difficile* PCR test in the following:
- Patients who have previously had a positive PCR for *C. difficile* in the last 21 days
- If stool specimen is received > 72 hours after being ordered
- When the specimen received in the laboratory is formed stool or Type 1-6 on the Bristol Stool Chart
- Only one specimen will be tested by PCR per 7 days if tested negative
Solutions

• Elimination of inappropriate testing
  – Ensure screening tool is utilized
  – Notify Infection Preventionists to review protocol to ensure appropriate testing
    ▪ The House Supervisor is notified after hours, weekends and holidays until everyone understands the process

• Appropriate testing
  – Prompt testing of patients with diarrheal illness within the first 3 days of hospital admission
  – Ensure patients meet criteria in testing guideline/algorhythm

• Notification of positive screening
  – Charge nurse, Infection Preventionist, Nurse Manager, Pharmacist, House Supervisor, and Physician
NHSN C diff LabID Event Reporting

• CDC NHSN Definition:
  – *C. difficile* LabID Event: A healthcare facility onset (HO) of a specimen collection date >3 days after inpatient admission to the facility.
    ▪ which can result in over reporting due to asymptomatic *C. difficile* colonization.

• The purpose of LabID event reporting is to enable laboratory testing data to be used without clinical evaluation of the patient and is least subjective.

• Prompt *C difficile* testing of patients with diarrheal illness within the first 3 days of hospital admission will improve hospital onset *C. difficile* LabID reporting accuracy.
Goals: Early, Rapid Identification, Diagnosis and Treatment of *C. Diff*

**Primary Goal**

Rapid Diagnosis that will prompt treatment and implementation of contact precautions that can limit the spread of *C. diff* in the environment of care.

- Screening tool in the ED and inpatient settings to Rapidly Identify Possible *C. diff* patients.
- Established testing criteria to rule in or rule out *C. diff* when test is being placed

**Secondary Goal**

Rule out C. Difficile in patient with Diarrhea

- Proper documentation of Stool in regards to consistency of stool, amount and over what time period
- Lab Policy with established criteria to process *C. diff* test based on the stool consistency and stated protocol.
- Hardwiring of placing patient on Contact precautions when suspected of C. diff or positive for *C. diff*. 
Methods

- A multidisciplinary *C. diff* Collaborative team formed that included Infection Prevention, Health Informatics, Lab, Pharmacy, Quality, Clinical Standards, Physicians and Nurses.
- A nursing screening tool based on the approved *C. diff* testing guideline was built within the ED and inpatient GI assessment.
- A *C. diff* order was built with clinical decision support to guide the provider(s) with appropriate guidelines for the ordering of a *C. diff* test.
- Job aids were developed and distributed 2 weeks prior to implementation.
- Notification to *C. diff* orders to the Infection Preventionists was placed in the EHR.
- A post-collaborative *C. diff* meeting for Phase 1 was held 6 months after implementation to evaluate the processes and the outcomes of the initiative.
If the top of the *C. diff* screen is positive and meet the case definition the *C. diff* risk factors are required to performed. If the *C. diff* risk factors are positive then the nurse is required to per the popup to "notify the provider and obtain an order for *C. diff* testing".
Clinical Decision Support Tool

The C. difficile testing is highly sensitive and frequently identifies colonized patients, thus should NOT be performed for patients with a low probability of infection. Not recommended as part of a fever workup or elevated WBC unless this is accompanying diarrhea. If any of the following statements are TRUE, this procedure should NOT be ordered:

- Less than 3 or more loose/liquid stools in a 24 hour period? [N]
- Laxatives administered 24-25 hours prior to loose stools? [N]
- Patient has an Ileostomy? [N]
- Positive C. difficile PCR results within the last 21 days? [N]
- Negative C. difficile PCR results within a 7-day period? [N]
- 12 to 36 months of age without risk factors... who have vomiting as a significant complaint? [Y]
- < 12 months of age? [Y]
- Collected by Care Area? [Y]
- Has specimen been collected/obtained? [N]
- Stool Characteristics: Loose

Ordering Information:
- Priority
- Quantity
- Date: 12/12/16
- Time: 0854
- Comments to Collector:
- Specimen Comment:
Clinical Decision Support Rule

If YES is answered to any of the questions, a message will pop-up with clinical decision to not order the test.

The patient does NOT meet criteria for C. difficile testing based on the responses within the ordering screen. Please provide an override reason in order to continue.

Override Rule Comment

Laxative, but has risk factors & clinically significant S/SX
No Diarrhea, but has toxic megacolon and ileus
Other
If NO is answered to all the question, the C. diff Isolation order will fire at the same time.
Bristol Stool Chart – Stool Documentation

The C. difficile testing is highly sensitive and frequently identifies colonized patients, thus should NOT be performed for patients with a low probability of infection.

Not recommended as part of a fever workup or elevated WBC unless this is accompanying diarrhea.

If any of the following statements are TRUE, this procedure should NOT be ordered.

1. Less than 3 or more loose/liquid stools in a 24 hour period?
2. Laxatives administered 24-25 hours prior to loose stools?
3. Patient has an ileostomy?
4. Positive C. difficile PCR results within the last 21 days?
5. Negative C. difficile PCR results within a 7-day period?
6. 12 to 36 months of age without risk factors...
7. < 12 months of age?
8. Collected by Care Area?
9. Has specimen been collected/obtained?

Software by MEDITECH

Bristol Stool Chart

Type 1 (Separate hard lumps)
Type 2 (Lumpy and sausage like)
Type 3 (Sausage shape with cracks)
Type 4 (Smooth, soft sausage)
Type 5 (Soft blobs, clear cut edge)
Type 6 (Mushy with ragged edges)
Type 7 (Liquid, no solid pieces)
Link to Bristol Chart from *C. diff* Order

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<table>
<thead>
<tr>
<th>Bristol Stool Chart</th>
<th>Type 7</th>
<th>Liquid, no solid pieces</th>
</tr>
</thead>
</table>

***Bristol Stool Chart is available within Reference Link***

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**BRISTOL STOOL CHART**

- **Type 1**: Separate hard lumps
  - Very constipated
- **Type 2**: Lumpy and sausage like
  - Slightly constipated
- **Type 3**: A sausage shape with cracks in the surface
  - Normal
- **Type 4**: Like a smooth, soft sausage or snake
  - Normal
- **Type 5**: Soft blobs with clear-cut edges
  - Lacking fibre
- **Type 6**: Mushy consistency with ragged edges
  - Inflammation
- **Type 7**: Liquid consistency with no solid pieces
  - Inflammation
Process Measures - 6 months

- *C. difficile* monthly rates per Compass 2020

- *C. difficile* testing

- Usage of ED and inpatient screening tool

- Cost savings – *C. difficile* testing
78% decrease in *C. difficile* LabID Events over a 13 month period.
C. difficile Ordering Results

Total ordering by month

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>1094</td>
</tr>
<tr>
<td>Feb</td>
<td>806</td>
</tr>
<tr>
<td>March</td>
<td>891</td>
</tr>
<tr>
<td>April</td>
<td>690</td>
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<tr>
<td>May</td>
<td>769</td>
</tr>
<tr>
<td>June</td>
<td>718</td>
</tr>
<tr>
<td>July</td>
<td>690</td>
</tr>
</tbody>
</table>

40% Decrease in C. Diff ordering over 6 month period
C. difficile Ordering Results (cont.).

C. diff Ordering by Month: 37% decrease in inappropriate ordering: total ordering, completed and cancelled orders

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
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<td>718</td>
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<tr>
<td>Completed</td>
<td>617</td>
<td>466</td>
<td>533</td>
<td>421</td>
<td>492</td>
<td>425</td>
<td>449</td>
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<tr>
<td>Cancelled</td>
<td>404</td>
<td>314</td>
<td>319</td>
<td>228</td>
<td>264</td>
<td>259</td>
<td>209</td>
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</tbody>
</table>
C. difficile Inappropriate Testing

Percentage of orders Completed vs Cancelled

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>APR</th>
<th>May</th>
<th>June</th>
<th>July</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Comp.</td>
<td>56%</td>
<td>58%</td>
<td>60%</td>
<td>61%</td>
<td>64%</td>
<td>62%</td>
<td>65%</td>
</tr>
<tr>
<td>Total Canceled</td>
<td>37%</td>
<td>39%</td>
<td>36%</td>
<td>33%</td>
<td>34%</td>
<td>38%</td>
<td>30%</td>
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</tbody>
</table>

- Total Comp. and Total Canceled percentages for each month from January to July.
Effect: Ordering and *C. difficile* Events

![Graph showing the correlation between ordering and C. difficile lab events.](image)

- **Effect:** Inappropriate ordering decreases, so does the number of C.diff LabID events.
Nurse Screening Tool

Number of Screens vs Positive. Total ED and Inpatient

<table>
<thead>
<tr>
<th></th>
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<th>APR</th>
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<th>Jun</th>
<th>Jul</th>
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<tbody>
<tr>
<td>Total</td>
<td>2201</td>
<td>5383</td>
<td>4905</td>
<td>3711</td>
<td>3761</td>
<td>3322</td>
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<tr>
<td>POST</td>
<td>151</td>
<td>198</td>
<td>185</td>
<td>191</td>
<td>228</td>
<td>205</td>
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Effect: Screening and Effects

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<td>228</td>
<td>205</td>
<td>229</td>
</tr>
<tr>
<td>Cdiff LabID Events</td>
<td>17</td>
<td>18</td>
<td>10</td>
<td>8</td>
<td>12</td>
<td>12</td>
<td>6</td>
</tr>
</tbody>
</table>

- 38% decrease in the number of screens
- 16% percent increase in the number of positive of screens
- 67 decrease in C diff LABID Events

It's all about... OUTCOMES!
Cost Savings

C. diff Initiative Cost Savings over 6 months Feb. 2017 to Jul. 2017

- Ordering Cost Sav.: $36,291
- Avoid events Cost sav.: $50,710
- Total savings over 6 months: $87,001
Lessons Learned

• Education of screen and order takes time to get hardwired with nurses and physician
• Pediatric population: Screen discontinued.
• Overriding of the *C. diff* test by professionals
• Re-educate that test for cure is not best practice
• Importance of early identification and prompt isolation
Next Steps

Next steps during Phase 2, the multidisciplinary team will continue to focus on:

• Reducing inappropriate testing

• Revising the screening tool

• Incorporating antibiotic stewardship

• Hand hygiene
Conclusion

• The use of a screening tool and a clinical decision support order based on a *C. difficile* testing guidelines resulted in positive outcomes

• 67% reduction in *C. difficile* LabID events over 6 months

• 40% reduction in inappropriate testing over a 6 month

• $87,000 dollars cost savings
  • due to a decrease in inappropriate testing and *C. difficile* avoidable events from the previous year.

Greater New York Hospital Association United Hospital Fund. Reducing C. Difficile infections toolkit; Best Practices from the GNYHA/UHF Clostridium Difficile collaborative. 2011

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Questions