Incorporating Electronic Medical Record Hard Stops to Reduce Inappropriate Clostridioides difficile Testing at an Academic Medical Center: A Quality Improvement Study

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Conclusion. Implementation of an alert for select patients using a bioinformatics algorithm reduced inappropriate CDI testing. Clinical decision support for CDI can lead to substantial cost savings for both antibiotic use and isolation precautions.

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2347. Impact of Multidisciplinary Review of *Clostridioides difficile* difficile Testing
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**Background.** Minimizing *Clostridioides difficile* difficile infections (CDI) is an important patient safety goal due to significant cost and disease burden with CDI causing 15,000 deaths annually in the United States. Diagnosis of CDI is complicated when DNA amplification assay will return positive for both colonization and active infection of *C. difficile*, so testing clinically symptomatic patients with at least 3 loose stools per day is paramount to obtaining accurate reporting rates and starting proper treatment for CDI.

**Methods.** Due to economic considerations, the study was a single-center retrospective review of patients ≥18 years old who had *C. difficile* tests ordered from November 2017 to February 2019. Baseline characteristics collected include age, sex, white blood cell (WBC) count, fever, past *C. difficile* infections, recent antibiotic use, recent laxative use, and tube feeding status. Data were analyzed using descriptive statistics. The primary study, a multidisciplinary review of *C. difficile* tests pre and post-implemention of multidisciplinary review. Criteria for appropriateness of testing included 3 or more loose stools in addition to one additional factor including fever, elevated WBCs, immunocompromised status, or severe sepsis/septic shock. Secondary objectives include evaluating hospital-onset CDI rates and cost analysis.

**Results.** Baseline characteristics were similar between the two groups with the exception of statistically fewer patients with 3 or more liquid stools found in the post-implementation group (P = 0.0003). After implementation of a multidisciplinary review, the number of *C. difficile* tests ran significantly declined from 79% to 56% (P = 0.0001). The number of negative tests also were significantly reduced from 60% to 43% (P = 0.0001), with patients who had less than 3 stools per day being tested less frequently in the post-implementation group. Inappropriate test avoidance resulted in an annual savings of $1,550 in testing supplies alone, not including isolation or labor costs. There was no significant difference in hospital-onset CDI.

**Conclusion.** Implementation of a multidisciplinary review of *C. difficile* testing avoids clinically inappropriate tests and results in cost savings with no effect on incidence of hospital-onset CDI.

**Disclosures.** All authors: No reported disclosures.

2348. Incorporating Electronic Medical Record Hard Stops to Reduce Inappropriate *Clostridioides difficile* difficile Testing at an Academic Medical Center: A Multi-disciplinary Quality Improvement Study
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**Background.** *Clostridioides difficile* difficile is the most common pathogen causing healthcare-associated infections. This study highlights the multi-disciplinary efforts to reduce *C. difficile* infections (CDI) at a large, tertiary care teaching facility.

**Methods.** A quality improvement study was performed between March 2017 and April 2018, using six Plan-Do-Study-Act cycles that included transmission prevention, diagnostic stewardship education, and antimicrobial stewardship. Process measures included hand hygiene, isolation precautions, low-level disinfection compliance, number of tests ordered, lab cancelation of tests, and compliance with the Electronic Medical Record (EMR) hard stop for patients with laxative use, and negative *C. difficile* test in the past 7 days.

**Results.** A total of 2,046 *C. difficile* tests were ordered during the initiative. Of the 124 patients with a positive *C. difficile* LabID event, 50% were male with a median age of 65 years (range: 11–92 years). A 53% reduction in *C. difficile* LabID events (7.5 to 4 events per 10,000 patient-days, P < 0.001), with a pronounced decrease between cycle 4 and 5 (5.4 to 2.9 events per 10,000 patient-days, P < 0.001) was achieved. The largest decrease in *C. difficile* lab tests ordered was seen after implementation of the EMR hard-stop (cycle 5), with fewer than 0.5 LabID events per 1,000 patient-days for each subsequent month after EMR hard-stop implementation. Frequent reasons for physician phone calls to Infection prevention department was related to chronic use of lactulose in patients with cirrhosis (30%) and unexplained diarrhea (70%). Based on provider feedback, EMR changes were made to remove lactulose from the hard-stop and offer infectious disease consultation upfront. There was 99% compliance with electronic medical record hard stop. There was a nonsignificant increase in lab cancelations to inappropriate stool specimens over time (1.9% to 3.1% from cycle 1 to 6, P = 0.28) A 55% reduction in hospital-onset CDI surveillance events (from 6.9 to 3.2 per 10,000 patient-days, P < 0.001) was noted.
Figure 3. Statistical process control u-chart for C. difficile hospital-associated infection surveillance for PDIA cycles 6-14 (Table 1; cycle number denoted in white boxes) that demonstrates the following special causes of variation when applying the “Eight Nation Rules” for control chart interpretation (B): one point below three standard errors (October 2017; cycle 5); two of three consecutive points between two and three standard errors on either side of the center line (March 2017; September 2017; November 2017; April 2018; cycles 1-3); and four of five consecutive points on either side of the center line beyond one standard error from the center line (September 2017; April 2018; cycles 5-6).

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2349. C. different results: Eliminating Inappropriate Stool PCR Tests Through an Interdisciplinary Infection Prevention and Microbiology Collaboration

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Background. Diagnosis of Clostridium difficile infection (CDI) is based on symptoms and laboratory results. Distinguishing between CDI vs colonization or antibiotic-associated diarrhea is challenging. Widespread adoption of a highly sensitive real-time nucleic-acid amplification assay for toxin B DNA (Xpert CD assay, Cepheid) by US hospital-based microbiology labs has increased the challenge, resulting in over-reporting of healthcare facility-onset CDI. Excess testing is inevitable in hospitals with EPIC electronic medical record (EMR) that incorporate best practice alerts (BPAs) prompting for C. difficile testing (CDT) when loose stools are charted by nursing staff.

Methods. Beginning October 1, 2018 microbiology and infection prevention (IP) staff at our 650 bed teaching hospital in central IL agreed to partner on a diagnostic stewardship effort to engage providers on potentially unnecessary or inappropriate CDTs. All stool samples sent to lab for CDT are held pending IP review. The IP required providers to document the indication for CDI testing, as well as a soft stop (SS) preventing providers from ordering CDI testing for patients who received laxatives within 24 hours. The DSOS was implemented at a hospital system in New York City (2 large academic medical centers, 2 community hospitals, 1 pediatric hospital: total 2,200 beds). The electronic health record is Allscripts SCM large academic medical centers, 2 community hospitals, 1 pediatric hospital: total 2,200 beds). The electronic health record is Allscripts SCM

Results. Between October 1, 2018 and December 31, 2018, 383 CDT were ordered on inpatients. 196 were requested within 3 days of admission, and 187 were ordered on beyond day 4. 56.6% (107/187) HO-CDTs were deemed inappropriate testing (CDT) when loose stools are charted by nursing staff.

Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count). Inappropriate CDT was defined as test of patients receiving pro-motility treatment, including patient history, medications (e.g., laxatives, stool softeners), nutrition (e.g., tube feeds), symptoms (abdominal pain), and labs (e.g., serum creatinine, WBC count).

Conclusion. A DSOS designed to reduce inappropriate CDI testing among patients who received laxatives within 24 hours was associated with a reduction in CDI testing and the CDI SIR. While use of a soft stop reduced CDI testing, the addition of a hard stop was associated with additional significant reductions in the CDI SIR.

Disclosures. All authors: No reported disclosures.

2350. Electronic Interventions to Improve Clostridioides difficile Ordering Practices and Incidence: Impact of Soft Stops vs. Hard Stops

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Background. Distinguishing between Clostridioides difficile infection (CDI) and asymptomatic colonization with a PCR-based test can be difficult and can lead to unnecessary antibiotic use, longer lengths of stay and inflated hospital-onset (HO) CDI rates. Additionally, inappropriate testing for CDI complicates this challenge. The Infectious Disease Society of America (IDSA) 2018 guidelines discourage CDI testing for patients who received laxatives within 48 hours. Our hospital implemented a two-phase clinical decision support order set (DSOS) to improve appropriateness of CDI testing.

Methods. The DSOS was implemented at a hospital system in New York City (2 large academic medical centers, 2 community hospitals, 1 pediatric hospital: total 2,200 beds). The electronic health record is Allscripts SCM. The first iteration of the DSOS required providers to document the indication for CDI testing, as well as a soft stop (SS) pop-up message prompting providers to reconsider testing in patients who received laxatives within 24 hours. The second phase of the DSOS utilized a hard stop (HS) that prevented providers from ordering CDI testing for patients who received laxatives within 24 hours. Providers needed to receive a pop-up with IDSA recommendations for CDI testing and contact information for the Clinical Microbiology Laboratory. If testing was still desired, the provider had to discuss the case with a Pathology resident or Infectious Disease specialist before the laboratory staff placed the order. The monthly number of orders and tests sent in the different time periods, pre-SS (April 2016–April 2017), post-SS (May 2017–2019, 2018), and post-HS (November 2018–March 2019), were compared using ANOVA. The National Healthcare Safety Network calculator was used to compare CDI incidence density ratios and SIRs between the three periods.

Results. SS implementation significantly reduced mean monthly orders (18%) and HO-CDI SIR (31%) but SIR remained above national benchmarks. Adding a HS further reduced orders (25%) and SIR (18%) (table).

Conclusion. A DSOS designed to reduce inappropriate CDI testing among patients who received laxatives within 24 hours was associated with a reduction in CDI testing and the CDI SIR. While use of a soft stop reduced CDI testing, the addition of a hard stop was associated with additional significant reductions in the CDI SIR.