provided C. difficile education to the study group. Nursing utilized the CDT algorithm, and the C. difficile PCR was sent if criteria were met to optimize testing stewardship. The primary objective was to assess the positive and negative predictive values (PPV and NPV) associated with CDT. A subgroup analysis included total tests and positive tests per patient days between study vs. control groups. The secondary objective was the rate of 10/10,000PD (PPV) and number of tests ordered and test positive 10,000PD pre- and post-implementation of CDT.

Results. There were 87 patients who had CDT performed from June 2017 to February 2018. There were 72 patients tested for C. difficile PCR, and 15 were not tested. Baseline demographics were similar between both groups. Patients in the tested group compared with control were more likely to meet the criteria for >3 loose BMs/day (88% vs. 40%, P = 0.002) and lack of new start on laxatives (7% vs. 33%, P = 0.012). Compared with the control group, there were fewer tests ordered for the study group (130 vs. 169 per 10,000PD, P = 0.10) and similar positive tests results (26 vs. 26 per 10,000PD). This led to a PPV of 83.7% and an NPV of 20.3%. Overall, the post-implementation group had lower number of tests ordered (122 vs. 158 per 10,000PD) and positive tests (22 vs. 26 per 10,000PD). We noticed a consistent overall decline in HO-CDI/10,000PD rates from 2016 vs. 2017 (6.18 vs. 2.13 per 10,000PD, P = 0.13).

Conclusion. With CDT utilization, there was a decline in total number of C. difficile tests ordered. Through this nurse-initiated algorithm, testing stewardship for C. difficile was optimized and a PPV and an NPV was uncovered. With the use of CDT in conjunction with antimicrobial stewardship efforts, there was an overall decline in HO-CDI/10,000PD after implementation of this algorithm.

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522. Impact of a Multicomponent Intervention Bundle on Healthcare Facility-Onset Clostridium difficile Rates
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Background. Clostridium difficile is the most common cause of healthcare-assiated infections in US hospitals. The National Healthcare Safety Network (NHSN) surveillance system tracks C. difficile infections (CDI), one of the measures used by Centers for Medicare and Medicaid Services (CMS) to determine a hospital’s total Hospital-Acquired Conditions (HAC) score and ranking among other hospitals. This is then used to calculate Value-Based Purchasing pay for performance incentive payments, which may lead to significant reductions in a facility’s reimbursement if rates are too high. The objective of this study was to assess the effectiveness of a multicomponent intervention bundle in reducing our healthcare facility-onset (HO) CDI rates.

Methods. This was a pre-post quasi-experimental retrospective study comparing CDI rate per 1,000 patient days and Standardized Infection Ratio (SIR) in the pre-intervention period from January 1, 2017 to December 31, 2017 to the intervention period from January 1, 2018 to March 31, 2018 in a 319-bed teaching hospital in northwest Ohio. We implemented a testing algorithm to guide physicians and nurses, focusing on increasing early detection and decreasing inappropriate testing. We enforced re-testing criteria, which did not allow re-testing within 7 days and in those who were positive during the admission. Infection Preventionists provided staff education. A dedicated C. difficile isolation cart was created. Contact isolation, hand hygiene, enhanced environmental cleaning and disinulation were reinforced. Treatment guidelines were established and antimicrobial stewardship reviews were performed on all cases to discourage unnecessary medications, encourage judicious use of antimicrobials, and ensure appropriate treatment.

Results. Our C. difficile rate per 1,000 patient days decreased from 0.826 in the pre-intervention period to 0.495 in the postintervention period, which resulted in 60% reduction in HO-CDI rate. The SIR also decreased from 1.207 to 0.677, yielding a 55% reduction.

Conclusion. Implementing a C. difficile multifaceted intervention bundle that emphasizes early and appropriate testing may reduce HO-CDI rates.

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523. Use of Whole-Genome Sequencing to Guide a C. difficile Diagnostic Stewardship Program
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Background. C. difficile infection (CDI) is a hospital-acquired infection that is diagnosed via several methods including stool culture, Point of Care Testing (POCT), and Nucleic Acid Amplification Testing (NAAT). Clinical decision making is complicated by the prevalence of C. difficile infection in the community, which can lead to unnecessary antimicrobial use and enhanced costs. As a result, the Centers for Medicare and Medicaid Services (CMS) has implemented Value-Based Purchasing (VBP) payments, which incentivizes hospitals to reduce CDI rates. However, because CDI cases are often not diagnosed using the standard methods, an additional approach is needed to improve diagnostic stewardship.

Methods. Isolates from CDI cases were sequenced for strain relatedness and epidemiologically analyzed using a single nucleotide polymorphism (SNP)-based approach. In June 2017, a diagnostic stewardship intervention began which included provider education and a weekly review of CDI orders placed after hospital day 3 for the following indications: >3 stools/24 hours, the presence of inflammatory bowel disease, the presence of fever/sepsis or a history of inflammatory bowel disease. In November 2017, an EMR-based testing algorithm was introduced to supplement the review process. Orders not meeting testing criteria were discussed with the ordering provider, with a suggestion to cancel orders without appropriate indications.

Results. WGS assigned 36 isolates to 19 different multi-locus sequence types (ST), including five assigned to ST-1, a sequence that encompasses the ribotype 027 clade (Figure 1). SNP-based analysis indicated closely related, but non-identical strains, inconsistent with nosocomial transmission. Six hundred forty-six CDI orders were reviewed, of which met criteria and 64 (15%) were positive. Two hundred twenty-five (35%) of orders were recommended for cancellation. The HO-CDI rate decreased from 11.67/10k in the 5-month baseline period to 7.13/10k in the 9-month intervention period (P = 0.0008) (Figure 2).

Conclusion. WGS revealed that nosocomial transmission of C. difficile was an unlikely cause for our elevated CO-CDI rate. A diagnostic stewardship intervention focused on identifying community-acquired infection and avoiding over-testing was associated with a sustained decrease in the HO-CDI rate which has persisted for 9 months.

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524. The Journey to Implement a Computerized Clinical Decision Support (CDS) Tool to Improve Testing for Clostridium difficile Infection (CDI)
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Background. CDI guidelines recommend hospitals relying on Nucleic Acid Amplification Testing (NAAT) apply criteria for appropriate submission. CDS tools could improve test utilization.

Methods. A CDS Epic Best Practice Advisory was added to the electronic health record (EHR) in the post intervention period on September 21, 2017. Hard stops were not available but the CDS prompted ordering NAAT with notification of cancellation if a prior positive/negative/positive test was done within 7/14 days; recommendation to cancel for laxatives within 48 hours; and to reconsider if tube feeds were initiated within 24 hours. Testing, which reviewed 421 (65%) positives was incorporated due to lack of standardized discrete documentation. Testing appropriateness was assessed pre- and post-CDS, as well as how alerts were handled Phase 1 (9/21 to 11/15/17), and after CDS modifications in Phase 2 (11/16/17 to 1/18/18) and Phase 3 (1/19 to 3/18/18). Charts of patients with healthcare onset CDI (HO CDI) LabID Events were reviewed for symptoms of true
CDI defined as diarrhea (≥3 loose stools over 24 hours) without laxatives. LabID HO CDI standardized infection ratios were tracked.

Results. Ongoing review of response to CDS alerts led to changes in the algorithm (Table 1). Inaccurate interpretation of indeterminate tests were corrected and a notification the laboratory would reject repeat tests and form stool over a 24-hour cancelation was added. Evaluation of declinations for unhelpful triggers led to modification of the laxative list (e.g., removed bulk forming agents) which decreased laxative declinations from 75–79% to 54%. Changes to the CDS did not drop the rate of alerts (3.8 to 3.6 on average per day) and providers continue to test for inappropriate indications. Review of HO CDI cases (Table 2) show patients without diarrhea continue to be tested (21% vs. 32% post-CDS), but more of those with diarrhea have not been on laxatives (38% pre- vs. 60% post). Pre to post-CDS, the HO CDI SIR has started to drop (Figure 1).

Conclusion. CDS with provider prompting improved ordering practices for CDI, but iterative changes to the tool were needed. Additional steps, such as enforcing hard stops should be explored. Greater nurse involvement, as with standardized discrete documentation to capture diarrhea, would enhance testing algorithms.

| TABLE 1 | Computerized Decision Support Phase | Phase 1 (8 days) | Phase 2 (21 days) | Phase 3 (31 days) |
|----------|------------------------------------|------------------|------------------|------------------|
| Description of changes made | Initial algorithm | Correct false PCR trigger | Add warning that labs reject repeat tests despite provider override | Remove latex levels |
| Alert category of episode on decision no. (%) declined | Tube tests altered | 14 (71%) | 10 (120%) | 10 (120%) |
| - Previous positive test 14 days | 6 (75%) | 4 (50%) | 3 (30%) |
| - Previous negative test 7 days | 6 (75%) | 6 (75%) | 6 (75%) |
| - Presence of diarrhea within 48 hours | 15 (78%) | 7 (88%) | 7 (88%) |
| Total alerts/day | 3.8 | 3.6 | 3.6 |

| TABLE 2 | Computerized Decision Support | PRE (over 16 weeks) | POST (over 22 weeks) |
|----------|-------------------------------|---------------------|---------------------|
| LabID HO CDI Events, no. | 42 | 50 |
| ≥ 3 new loose stools prior 24 hours, no. (% of HO CDI) | 33 (79%) | 34 (80%) |
| Diarrhea without laxatives prior 48 hours, no. (% of HO CDI) | 16 (38%) | 30 (60%) |

Figure 1: HO CDI Standardized Infection Ratios (SIR) and 95%CI

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525. The Impact of Switching to Molecular Testing on Clostridium difficile Infection Rates: Large-Scale Assessment Using an Interrupted Time Series Poisson Regression Approach

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Background. Clostridium difficile is the most common cause of hospital-acquired infections in the United States, affecting over 500,000 patients per year at a cost of nearly $5 billion. The reported incidence of C. difficile infections (CDIs) has increased in recent years, partly due to broad adoption of polymerase chain reaction (PCR) testing replacing enzyme-linked immunosorbent assay (ELISA) methods. Our aim was to assess the contribution of this change on reported CDI incidence using a large-scale empirical data set.

Methods. We retrospectively analyzed 8 years of CDI surveillance data (2009–2016) collected from 47 hospitals in the Duke Infection Control Outreach Network. During this period, 24 hospitals switched to PCR testing, 10 used ELISA throughout, and 13 used PCR throughout. We used interrupted time series analysis to quantify the relative change in incidence rate (IRR) of CDIs due to the switch from nonmolecular (ELISA) to molecular (PCR) testing. Data were aligned across hospitals at their intervention point, set at the reported test change date or nearest available measurement. Individual hospital and network-wide estimates of the PCR-over-ELISA IRR were determined through Poisson regression, controlling for total patient days, proportion of intensive care unit patient-days as a proxy for acuity, background trends, and previously detected clusters.

Results. Average monthly CDI rates significantly increased after the test change from 11.7 to 26.8 per 10,000 patient-days in hospitals that switched to PCR testing. A similar difference was observed between ELISA-only and PCR-only hospitals, which averaged 12.7 and 21.0 CDIs per 10,000 patient-days, respectively. Regression analysis yielded hospital-specific test change IRRs ranging from 0.70 (95% confidence interval [CI]: 0.48–1.02) to 3.64 (CI: 2.77–8.46) (Figure 1) and a network-wide IRR of 1.79 (CI: 1.73–1.90). Results also found an increasing background trend of 0.9 CDIs per 10,000 patient-days per year (CI: 0.7–1.2) (Figure 2), as well as a significant effect of known clusters (IRR of 1.56; CI: 1.48–1.65).

Conclusion. Hospitals that switched to molecular testing experienced an average post-change increase of 80% in reported CDI rates, similar to that observed during known cluster periods.

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526. An EMR-Based Diagnostic Stewardship Intervention for GI mPCR Aimed at Reducing Inappropriate C. difficile Tests

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Background. Diagnostic stewardship is an emerging tool that can be used to prevent overuse of diagnostics. Because GI mPCR (GI multiplex PCR panel) tests can be ordered...