

Results: Of 2,493 evaluated patients, 1,320 met the inclusion criteria. Among them, 44% of courses were initiated in the emergency department, 37% of patients had ≥ 1 risk factor for healthcare-associated infections, and 50% of patients had ≥ 2 SIRS criteria or required vasopressor support. The most common admission diagnoses were skin and soft-tissue infection (SSTI, 40%; 68% nonpurulent) and pneumonia (27%; 46% without healthcare risk factors). Clinical cultures recovered MRSA from 8% of patients. Empiric therapy was not justified in 342 patients (26%; 57% were clinically stable). Continued therapy was unjustified in 46% of the 320 patients who received >4 days of anti-MRSA therapy. Of all days of anti-MRSA therapy, 23% were unjustified; 65% of these were due to unjustified empiric therapy. Site-specific variations in unjustified empiric therapy better correlated with the proportion of unjustified DOT than did unjustified continuation of therapy (Pearson correlation coefficients [PCC], 0.75 and 0.54, respectively) (Fig. 1). Facility-specific proportions of unjustified DOT modestly correlated with anti-MRSA DOT (PCC, 0.45; $n = 27$) (Fig. 2) but not the anti-MRSA standardized antimicrobial administration ratio (PCC, 0.15; $n = 21$). **Conclusions:** In this multicenter MUE, 26% of all days of anti-MRSA therapy lacked justification; this rate correlated with total facility-specific anti-MRSA DOT. Unnecessary empiric therapy, largely in the ED and for nonpurulent SSTIs and pneumonia without risk factors, was the principal contributor to unjustified DOT.

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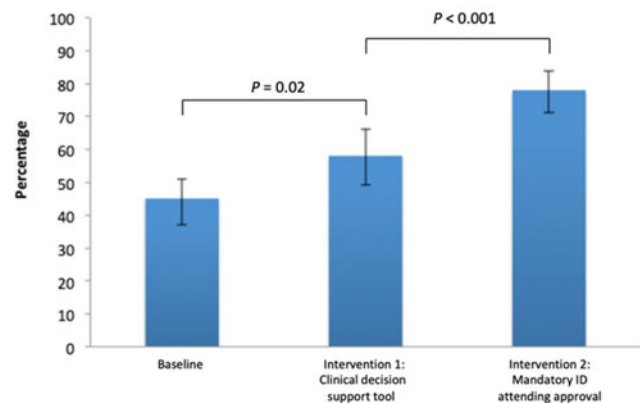
Poster Presentation

Appropriateness of *C. difficile* Testing With Clinical Support Tool Versus Mandatory Infectious Diseases Attending Approval

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Background: In an effort to reduce inappropriate testing of hospital-onset *Clostridioides difficile* infection (HO-CDI), we sequentially implemented 2 strategies: an electronic health record-based clinical decision support tool that alerted ordering physicians about potentially inappropriate testing without a hard stop (intervention period 1), replaced by mandatory infectious diseases attending physician approval for any HO-CDI test order (intervention period 2). We analyzed appropriate HO-CDI testing rates of both intervention periods. **Methods:** We performed a retrospective study of patients 18 years or older who had an HO-CDI test (performed after hospital day 3) during 3 different periods: baseline (no intervention, September 2014–February 2015), intervention 1 (clinical decision support tool only, April 2015–September 2015), and intervention 2 (ID approval only, December 2017–September 2018). From each of the 3 periods, we randomly selected 150 patients who received HO-CDI testing (450 patients total). We

Percentage of HO-CDI Tests that Met Appropriateness Criteria During Three Time Periods



Note. HO-CDI= Hospital-onset *Clostridioides difficile* infection. ID= Infectious Diseases. 150 patients with HO-CDI testing were randomly selected for review of appropriateness during each time period. Rate differences were tested using Chi-squared test.

Fig. 1.

restricted the study to the general medicine, bone marrow transplant, medical intensive care, and neurosurgical intensive care units. We assessed each HO-CDI test for appropriateness (see Table 1 for criteria), and we compared rates of appropriateness using the χ^2 test or Kruskal-Wallis test, where appropriate. **Results:** In our cohort of 450 patients, the median age was 61 years, and the median hospital length of stay was 20 days. The median hospital day that HO-CDI testing was performed differed among the 3 groups: 12 days at baseline, 10 days during intervention 1, and 8.5 days during intervention 2 ($P < .001$). Appropriateness of HO-CDI testing increased from the baseline with both interventions, but mandatory ID approval was associated with the highest rate of testing appropriateness (Fig. 1). Reasons for inappropriate ordering did not differ among the periods, with <3 documented stools being the most common criterion for inappropriateness. During intervention 2, among the 33 inappropriate tests, 8 (24%) occurred where no approval from an ID attending was recorded. HO-CDI test positivity rates during the 3 time periods were 12%, 11%, and 21%, respectively ($P = .03$). **Conclusions:** We found that both the clinical decision support tool and mandatory ID attending physician approval interventions improved appropriateness of HO-CDI testing. Mandatory ID attending physician approval leading to the highest appropriateness rate. Even with mandatory ID attending physician approval, some tests continued to be ordered inappropriately per retrospective chart

Table 1.

Table: Reasons for Inappropriate HO-CDI Testing During Each Intervention Period

	Baseline	Intervention 1 (Clinical Decision Support Tool)	Intervention 2 (ID attending approval)	P
<3 documented stools, n/N (%)	62/83 (75)	41/63 (65)	21/32 (65)	0.39
No diarrheal ^a stools charted in prior 24 hours, n/N (%)	9/74 (12)	2/60 (3)	1/30 (3)	0.10
Laxative ^b use in prior 24 hours, n/N (%)	38/83 (46)	34/63 (54)	15/33 (45)	0.57

Note. HO-CDI= Hospital-onset *Clostridioides difficile* infection. P value tests the null hypothesis that the proportions are equal across the three time periods. Rate differences were calculated using the Kruskal-Wallis Test.

^aDiarrhea was defined as liquid, loose, or soft stools.

^bLaxatives included: lactulose, magnesium citrate, polyethylene glycol, sodium phosphate enema, oral mineral oil, sorbitol 70% solution, glycerin rectal suppository and solution, senna-docusate, and sennosides solution.

review; we suspect that this is partly explained by underdocumentation of criteria such as stool frequency. In healthcare settings where appropriateness of HO-CDI testing is not optimal, mandatory ID attending physician approval may provide an option beyond clinical decision-support tools.

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Appropriateness of Initiating Antibiotics for Urinary Tract Infection Among Nursing Home Residents

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Background: Antibiotics are among the most commonly prescribed drugs in nursing homes; urinary tract infections (UTIs) are a frequent indication. Although there is no gold standard for the diagnosis of UTIs, various criteria have been developed to inform and standardize nursing home prescribing decisions, with the goal of reducing unnecessary antibiotic prescribing. Using different published criteria designed to guide decisions on initiating treatment of UTIs (ie, symptomatic, catheter-associated, and uncomplicated cystitis), our objective was to assess the

appropriateness of antibiotic prescribing among NH residents. **Methods:** In 2017, the CDC Emerging Infections Program (EIP) performed a prevalence survey of healthcare-associated infections and antibiotic use in 161 nursing homes from 10 states: California, Colorado, Connecticut, Georgia, Maryland, Minnesota, New Mexico, New York, Oregon, and Tennessee. EIP staff reviewed resident medical records to collect demographic and clinical information, infection signs, symptoms, and diagnostic testing documented on the day an antibiotic was initiated and 6 days prior. We applied 4 criteria to determine whether initiation of treatment for UTI was supported: (1) the Loeb minimum clinical criteria (Loeb); (2) the Suspected UTI Situation, Background, Assessment, and Recommendation tool (UTI SBAR tool); (3) adaptation of Infectious Diseases Society of America UTI treatment guidelines for nursing home residents (Crnich & Drinka); and (4) diagnostic criteria for uncomplicated cystitis (cystitis consensus) (Fig. 1). We calculated the percentage of residents for whom initiating UTI treatment was appropriate by these criteria. **Results:** Of 248 residents for whom UTI treatment was initiated in the nursing home, the median age was 79 years [IQR, 19], 63% were female, and 35% were admitted for postacute care. There was substantial variability in the percentage of residents with antibiotic initiation classified as appropriate by each of the criteria, ranging from 8% for the cystitis consensus, to 27% for Loeb, to 33% for the UTI SBAR tool, to 51% for Crnich and Drinka (Fig. 2). **Conclusions:** Appropriate initiation of UTI treatment among nursing home residents remained low regardless of criteria used. At best only half of antibiotic treatment met published prescribing

Figure 1. Summary of criteria used to assess appropriateness of antibiotic treatment initiation for urinary tract infections.

Loeb Criteria (ICHE 2001)	UTI SBAR Tool (AHRQ 2012)	Crnich & Drinka (Annals of LTC 2014)	Cystitis Consensus (JAMA 2018)
Purpose			
To establish minimum criteria for initiating antibiotics	To promote better communication of information needed for antibiotic decision making	To establish minimum criteria for initiating antibiotics, based on published guidelines	To identify criteria for uncomplicated cystitis and discourage prescribing for asymptomatic bacteriuria
Signs of Systemic Infection			
<ul style="list-style-type: none"> Fever Rigors Mental status change (delirium) 	<ul style="list-style-type: none"> Fever Rigors Mental status change (delirium) Hypotension 	<ul style="list-style-type: none"> Fever Rigors Mental status change (delirium) Unstable Vital Signs <ul style="list-style-type: none"> Decreased oxygenation Respiratory rate \geq25 breaths per minute Hypotension 	None
Localizing Urinary Signs and Symptoms			
<ul style="list-style-type: none"> Dysuria Urgency Frequency Hematuria Suprapubic pain Incontinence Costovertebral angle tenderness 	<ul style="list-style-type: none"> Dysuria Urgency Frequency Hematuria Suprapubic pain Incontinence Costovertebral angle tenderness 	<ul style="list-style-type: none"> Dysuria Urgency Frequency Hematuria Suprapubic pain Incontinence Costovertebral angle tenderness Scrotal / Prostate Tenderness Purulent urethral discharge 	<ul style="list-style-type: none"> Dysuria Urgency Frequency Hematuria Suprapubic pain
Diagnostic Testing			
None	None	Urine Culture Urinalysis	None

Fig. 1.