

**Background.** Antibiotics are the most common prescription drugs given to children, yet inappropriate usage is common. This study compared antibiotic prescribing practices for community-acquired pneumonia (CAP) in the Children's Hospital of Pittsburgh (CHP) Emergency Department (ED) vs. outpatient practices at sites affiliated with CHP.

**Methods.** We reviewed electronic medical records from November 2016 through April 2017 for patients ages 6–71 months who were diagnosed with CAP in the CHP ED and CHP-affiliated outpatient sites. Any healthy child with the appropriate ICD-10 code was included. The primary outcome measure was the prescribed antibiotic treatment. We compared children who received first-line CAP treatment, amoxicillin, per the Infectious Disease Society of America (IDSA) guidelines, vs. second-line CAP treatments: amoxicillin-clavulanate and cefdinir. We collected any noted justifications for antibiotic choice and compared prescribing practices amongst provider types, including physicians, residents, nurse practitioners, and physician assistants. The information was entered into a REDCap database.

**Results.** A total of 1,565 children were included; 52.6% were male, with a mean age of 2.99 years. Three hundred fifty-one of 1,565 (22.4%) were diagnosed in the ED. The prescriptions were as follows: amoxicillin (807/1,565, 51.6%), amoxicillin-clavulanate (231/1,565, 14.8%), cefdinir (156/1,565, 10.0%), azithromycin (270/1,565, 17.3%), combination therapy (47, 3.0%), and all others (54, 3.5%). In the ED, 232/351 (66.1%) children were prescribed amoxicillin, in contrast to 603/1,214 (49.7%) in the outpatient practices ( $P < 0.05$ ). If clinicians did not prescribe first-line therapy, most commonly their reasoning was not provided (402/730, 55.1%). When noted, the most common reasons included: coverage for atypical organisms (115/730, 15.8%), drug allergy (106/730, 14.5%), and recent antibiotic use (55/730, 7.5%).

**Conclusion.** Providers in the CHP ED were more likely to prescribe first-line therapy of amoxicillin as per IDSA guidelines than their outpatient practice counterparts.

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

### 177. Use of Electronic Best Practice Alert (BPA) to Reduce Inappropriate Testing for *Clostridium difficile* Infection (CDI) at a Tertiary Care Center

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**Session:** 50. Antimicrobial Stewardship: Interventions Leveraging the Electronic Health Record

Thursday, October 4, 2018: 12:30 PM

**Background.** *Clostridium difficile* assays are unable to differentiate between active infection and asymptomatic carriage. Failure to account for noninfectious causes of diarrhea in hospitalized patients may contribute to overdiagnosis of CDI, leading to unnecessary treatment and increased cost of care. This study assessed if a best practice alert (BPA) could improve ordering practices.

**Methods.** A BPA was instituted in a tertiary academic medical center in the electronic ordering system on July 17, 2017 alerting providers ordering *C. difficile* testing if their patient had received laxatives, oral contrast, or initiation of tube feeds within the preceding 48 hours. Reevaluation of diarrhea was recommended 48 hours after discontinuation of laxatives or initiation of new tube feeds in stable patients. BPA override was available for the following scenarios: high clinical suspicion, concern for severe disease and diagnosis cannot be delayed, ileus, worsened diarrhea on chronic tube feeds, worsened diarrhea on chronic laxatives. The rate of test positivity was compared before and after BPA implementation by  $\chi^2$  test.

**Results.** Between July 17, 2017 and December 31, 2017, the BPA triggered in 1,284 unique clusters (all BPAs firing within 48 hours of another BPA were considered a single cluster). Chart review showed cancellation of CDI testing in 416 (32.4%) cases and delayed tests for at least 24 hours in 163 (12.7%) cases. Of 868 tests where the BPA was initially or ultimately overridden after 24 hours, 186 (21%) were positive. The most common reasons for BPA override were: 512 (39.9%) high clinical suspicion and 177 (13.8%) worsened diarrhea on tube feeds. The rate of inpatient CDI testing declined from 191.6/10,000 patient-days in the January–June 2017 period to 165.9/10,000 patient-days in July–December 2017 ( $P < 0.001$ ). The proportion of positive tests increased from 8.4% to 10.6% ( $P = 0.006$ ) over the same time periods. Two cases of delayed diagnosis were identified; no treatment complications were noted on chart review.

**Conclusion.** An electronic BPA may be an effective tool to identify alternative etiologies of diarrhea in hospitalized patients and reduce inappropriate/enrich appropriate CDI testing. No adverse outcomes were noted in patients with delayed CDI diagnosis.

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### 178. Impact of a Best Practice Alert Linking *Clostridium difficile* Infection Test Results to a Severity-Based Treatment Order Set

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**Session:** 50. Antimicrobial Stewardship: Interventions Leveraging the Electronic Health Record

Thursday, October 4, 2018: 12:30 PM

**Background.** Adherence to practice guidelines for the treatment of *Clostridium difficile* infection (CDI) has been associated with improved patient outcomes. In March 2014, the hospital's Antimicrobial Stewardship Program (ASP) implemented a best practice alert (BPA) in the electronic medical record linking a positive test result to guideline-based CDI orders for those not on CDI therapy. We sought to assess provider adherence to practice guidelines before and after implementation of this clinical decision support tool.

**Methods.** In this quasi-experimental study, a retrospective chart review was conducted on inpatients diagnosed with CDI, defined using a tiered testing algorithm. Those diagnosed with CDI in 2013 served as controls before BPA implementation and patients from 2016 served as cases. Antibiotic prescribing was assessed and guideline compliance evaluated based on institutional guidelines for CDI treatment. Secondary endpoints were resolution of diarrhea, length of stay, in-hospital mortality, 30-day recurrence, and readmission rate. Continuous variables were analyzed using a two-tailed Student's *t*-test, or for non-normally distributed data, Mann-Whitney *U* test. Categorical variables were analyzed using chi-square.

**Results.** Based on power analysis, 131 CDI cases were randomly selected, 66 in 2013 and 65 in 2016, which accounts for 23.7% (66/278) and 15.9% (65/409) of total inpatient CDI cases, respectively. Mean age was  $55.0 \pm 19.3$  years pre-BPA/Order set and  $58.5 \pm 14.1$  in the post-group. Immunocompromise was present in 53% of the pre-group when compared with 32.3% in the post-group. The majority of patients in both the pre-BPA/Order set group and post-group received metronidazole as initial therapy with 69.7% and 75.4%, respectively. The BPA was opened in 54% (28/57) of triggered encounters and led to signed orders in 82% (23/28) of those patients. Guideline-based prescribing increased from 39.4% in 2013 to 67.7% overall in 2016 ( $P = 0.014$ ). Secondary endpoints were not significantly different between groups.

**Conclusion.** After implementation of the BPA linked to a severity-based treatment order set, there was an increase in guideline-compliant prescribing for CDI. Developing a better understanding of how to optimize guideline adherence using BPAs will aid ASPs in determining future improvement efforts.

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### 179. A Passive, Prescriber-Directed, Electronic Alert Plus Prescriber Education Decreased Antibiotic Prescribing for Ambulatory Adults With Acute, Uncomplicated Bronchitis in a Large Integrated Health System

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**Session:** 50. Antimicrobial Stewardship: Interventions Leveraging the Electronic Health Record

Thursday, October 4, 2018: 12:30 PM

**Background.** Antibiotics (ABX) are often prescribed for acute bronchitis (AB). Reducing inappropriate ambulatory ABX use is critical to combat ABX resistance and reduce ABX-related adverse events. We sought to determine the impact of a passive, prescriber-directed, electronic best practice alert (BPA) coupled with prescriber education on ABX prescribing for ambulatory adults with AB.

**Methods.** A retrospective, quasi-experimental study of adults with a primary diagnosis of AB discharged from any emergency department (ED), urgent care (UC), or ambulatory clinic (AC) within an integrated health system was performed. AB diagnosis codes triggered the BPA. An online continuing education course was created for prescribers. The preintervention period (PRE) was January 1, 2016–November 30, 2016 for UC and ED sites and January 1, 2016–September 28, 2017 for AC sites. The postintervention period (POST) was December 1, 2016–March 31, 2018 for UC and ED sites and September 29, 2017–March 31, 2018 for AC sites. The primary outcome was an ABX prescription targeting the upper respiratory tract. Patient- and prescriber-level data were collected. Forward stepwise multivariable (MV) logistic regression was used to determine predictors of ABX prescribing, with a *P*-value of  $< 0.05$  for model entry.

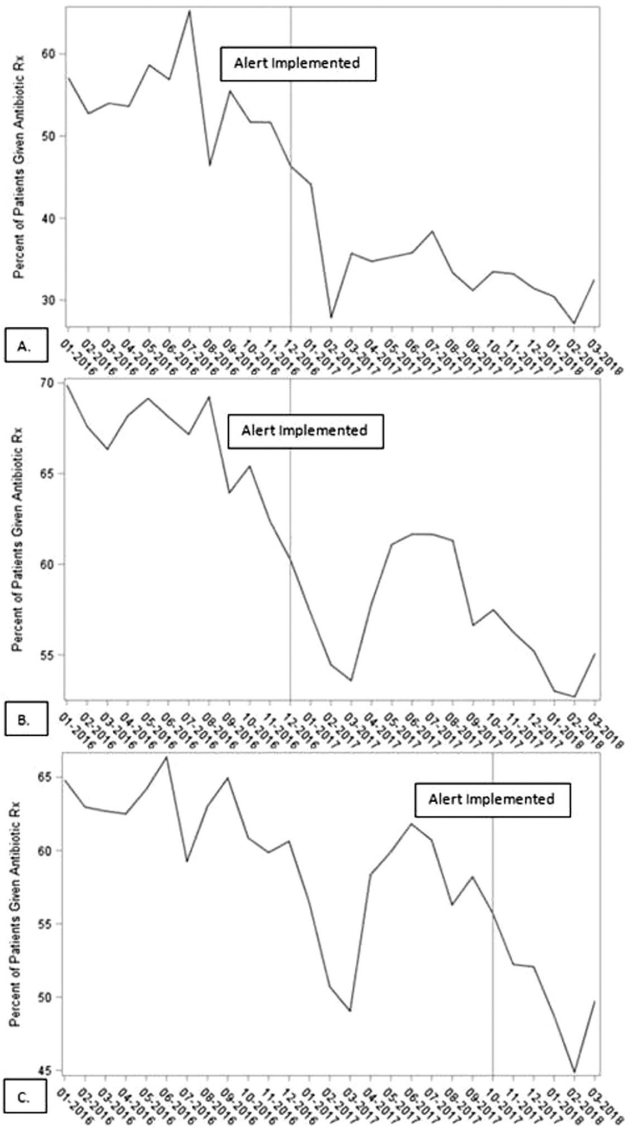
**Results.** A total of 136,818 unique ambulatory adults had a primary diagnosis of AB. An 8.3% reduction in ABX prescribing for AB was observed (49,246 out of 79,299 patients [62.1%] pre- vs. 30,918 out of 57,519 patients [53.8%] post;  $P < 0.0001$ ), corresponding to 3,652 less ABX prescriptions. ABX prescribing rates by setting are shown in Table 1 and Figure 1. In MV analysis, POST patients were less likely to receive ABX (aOR = 0.60, 95% CI = 0.58–0.62); however, patients who smoked or presented for a walk-in visit were more likely to receive ABX (aOR = 1.148, 95% CI = 1.11–1.19 and aOR = 1.45, 95% CI = 1.40–1.50, respectively).

**Conclusion.** A passive, prescriber-directed, electronic BPA combined with education was associated with a statistically significant reduction in ABX prescribing for ambulatory adults with AB, particularly in the ED.

**Table 1.** ABX Prescribing Rates by Setting

		ABX Prescribed, n (%)
ED	Pre	1,585 (54.4)
	Post	1,256 (34.4)
UC	Pre	19,045 (66.8)
	Post	23,749 (56.4)
AC	Pre	28,616 (59.8)
	Post	5,913 (50.2)

**Figure 1.** ABX Prescribing Rates over Time for (A) ED, (B) UC, and (C) AC.



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**180. Best Practice Advisory Decreases Inpatient Urine Culture Orders**  
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**Session:** 50. Antimicrobial Stewardship: Interventions Leveraging the Electronic Health Record  
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**Background.** Overprescribing of antibiotics for asymptomatic bacteriuria is common and studies reveal that antibiotic prescriptions often correlate with a positive urinalysis (UA) or urine culture (UCx), rather than signs or symptoms of a urinary tract infection. In attempts to decrease inappropriate UCx orders, the antimicrobial stewardship team developed a best practice advisory (BPA) within our electronic health record (EHR). The objective of this study was to evaluate the effects of the BPA on the number of UCx performed.

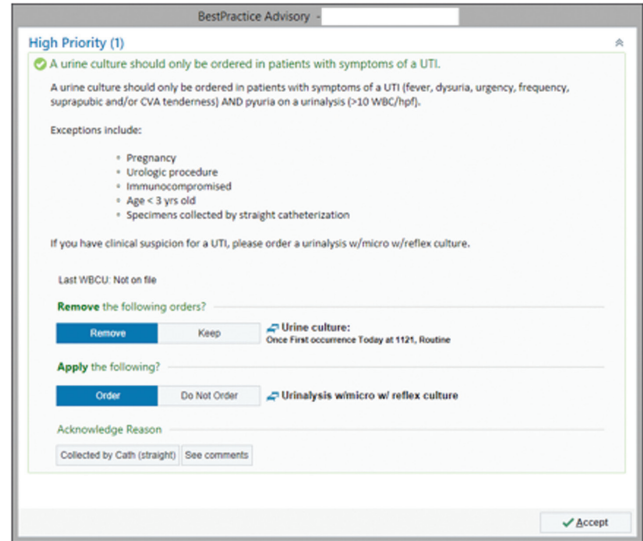
**Methods.** This intervention took place in an urban, level 1 trauma, public safety, teaching hospital. A BPA was developed within the EHR (Epic), which activated if a standalone UCx was ordered on a patient without a positive UA within the past 24 hours (defined as  $\geq 10$  WBC/HPF) (Figure 1). The BPA prompted providers to discontinue the UCx order and alternatively order a UA with reflex to culture (excluding pregnant women, immunocompromised, children <3 years old, urine collected by straight catheterization, or patients undergoing urologic procedures). In this retrospective pre-intervention–postintervention study, the preintervention period was May 2016 through October 2017, and the intervention period was December 2017 through

March 2018. The BPA was activated in November 2017. The primary outcome was UCx performed/1,000 patient-days.

**Results.** During the 4-month intervention period, the BPA was activated 120 times. The UCx order was replaced by a UA with reflex to culture in 47% (56/120) of cases, while removal of the UCx alone was seen in 6% (7/120) of cases. The remainder of cases did not remove the original order with reasons including urine sample obtained by straight catheterization, urine culture added to prior urinalysis, a critically ill patient with encephalopathy (Figure 2). During the intervention period, there was a statistically significant decrease in both the number of standalone UCx performed from 41.2/1,000 patient-days to 30.1/1,000 patient-days ( $P = 0.008$ ) and the total number of UCx performed 58.7/1,000 patient-days to 53.0/1,000 patient-days ( $P = 0.02$ ) (Figure 3).

**Conclusion.** Implementation of a BPA to prevent the use of standalone UCx in favor of a UA with reflex culture reduced the total number of UCx performed.

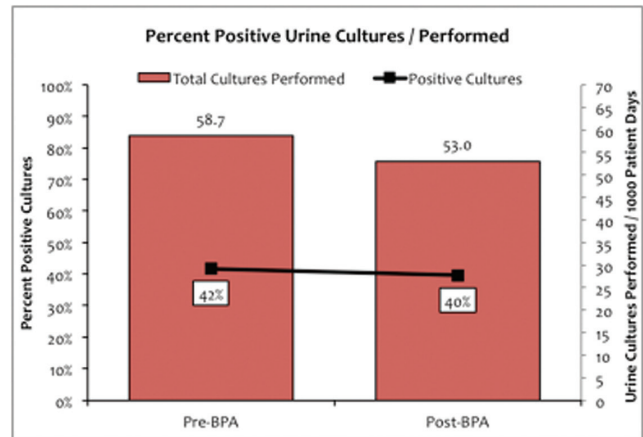
**Figure 1:**



**Figure 2:**



**Figure 3:**



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