MUA and MUP, respectively. **Conclusions:** Targets to improve oral antibiotic prescribing for children in a large PBRN include antibiotic prescribing for diagnoses that never require an antibiotic. Larger comparative studies may focus on the role (if any) that MUA/MUP has on antibiotic prescribing.

Disclosures: None

Antimicrobial Stewardship & Healthcare Epidemiology 2023;3(Suppl. S2):s40–s41

doi:10.1017/ash.2023.272

Presentation Type:
Poster Presentation - Poster Presentation
Subject Category: Antibiotic Stewardship

In-depth assessment of critical access hospital stewardship program adherence to the CDC Core elements in Iowa and Nebraska

Jonathan Ryder; Jeremy Tigh; Andrew Watkins; Jenna Preusker; Daniel Schroeder; Muhammad Salman Ashraf and Trevor Van Schooneveld

Background: Critical-access hospitals (CAHs) are required to meet the CDC 7 Core Elements of antimicrobial stewardship programs (ASPs). CAHs have lower adherence to the core elements than larger acute-care hospitals, and literature defining which core-element deficiencies exist within CAHs as well as barriers to adherence is lacking. **Methods:** We evaluated 21 CAH ASPs (5 in Nebraska and 15 in Iowa) that self-identified as potentially deficient in the Core Elements, via self-assessment followed by in-depth interviews with local ASP team members to assess adherence to the CDC Core Elements for ASPs. Core-element compliance was rated as either full (1 point), partial (0.5), or deficient (0), with a maximum score of 7 per ASP. High-priority recommendations to ensure core-element compliance were provided to facilities as written feedback. Self-reported barriers to implementation were thematically categorized. **Results:** Among the 21 CAH ASPs, none fully met all 7 core elements (range, 2.5–6.5), with a median of 5 full core elements met (Fig. 1). Only 6 ASPs (28.6%) had at least partial adherence to each of the 7 core elements. Action (21 of 21, 100%) and leadership commitment (16 of 21, 76.2%) were the core elements with the highest adherence, and accountability (4 of 21, 19%) and education (9 of 21, 42.9%) were the lowest. The most frequent high-priority recommendations were to provide physician and pharmacist leader ASP training (19 of 21, 90.5%), to track antimicrobial stewardship interventions (12 of 21, 57.1%), and to provide or track educational activities (12 of 21, 57.1%) (Fig. 2). One-third of programs were recommended to establish a physician leader. The most commonly self-identified barriers to establishing and maintaining an ASP were a lack of dedicated resources such as time of personnel (15 of 20, 75%), lack of infectious diseases expertise and training (8 of 20, 40%), and electronic medical record limitations (5 of 20, 25%) (Fig. 3). **Conclusions:** CAH ASPs demonstrate several critical gaps in achieving adherence to the CDC Core Elements, primarily in training for physician and pharmacist leaders and providing stewardship-focused education. Further resources and training customized to the issues present in CAH ASPs should be developed.

Core Element	Core Element Fully Met	Core Element Partially Met	Deficient
Leadership Commitment, N (%)	16 (76.2)	5 (23.8)	0 (0)
Accountability, N (%)	4 (19)	10 (47.6)	7 (33.3)
Drug Expertise, N (%)	10 (47.6)	10 (57.6)	1 (4.8)
Action, N (%)	21 (100)	0 (0)	0 (0)
Tracking, N (%)	15 (71.4)	5 (23.8)	1 (4.8)
Reporting, N (%)	15 (71.4)	5 (23.8)	1 (4.8)
Education, N (%)	9 (42.9)	0 (0)	12 (57.1)

Figure 1: Adherence to the Individual CDC Antibiotic Stewardship Core Elements at Small and Critical Access Hospitals Among 21 Critical Access Hospitals in Iowa and Nebraska

Recommendation Type	Number of Hospitals Given Recommendation, n=21 (%)
Leadership Support	
Establish ASP committee meetings	7 (33.3)
Improve ASP committee representation and define committee roles	2 (9.5)
Update ASP policy	1 (4.8)
Add ASP duties to job description	1 (4.8)
Accountability/Pharmacy Expertise	
Provide physician and pharmacist leader ASP training	19 (90.5)
Establish physician leader	7 (33.3)
Establish pharmacist leader	1 (4.8)
Collaborate between contract pharmacy and hospital	1 (4.8)
Action/Tracking	
Track antimicrobial stewardship interventions	12 (57.1)
Track antibiotic use	10 (47.6)
Implement antibiotic time-out and track usage	9 (42.9)
Implement order sets and track usage	8 (38.1)
Implement treatment guideline and track adherence	3 (14.3)
Collaborate with larger hospital system for EMR support with interventions	3 (14.3)
Implement intervention for treatment durations	2 (9.5)
Implement antibiotic indication and duration into ordering process	1 (4.8)
Establish system for missed culture follow-up	1 (4.8)
Reporting	
Report antibiotic use data to NHSN	6 (28.6)
Report antibiotic use to clinicians	4 (19)
Report via quality committee	4 (19)
Education	
Provide and track educational activities	12 (57.1)
Provide education on rapid identification panels	3 (14.3)

Figure 2: Top Recommendations Stratified by Core Element

Abbreviations: ASP: Antimicrobial Stewardship Program; EMR: Electronic Medical Record; NHSN: National Healthcare Safety Network

Barriers to ASP Initiation/Improvement	Number of Hospitals, n=20 (%)
Lack of dedicated resources, including time and personnel	15 (75)
Lack of infectious disease physician or knowledge	8 (40)
EMR limitations	5 (25)
Too few patients to make an impact	4 (20)
Need for clinician support and/or prioritization	5 (25)
Skilled beds antibiotic use	2 (10)

Figure 3: Self-Identified Barriers to Successful Antimicrobial Stewardship Program Initiation and/or Improvement. One hospital with missing data. Up to 3 responses per hospital.

Abbreviations: ASP: antimicrobial stewardship program; EMR: electronic medical record

Disclosures: None

Antimicrobial Stewardship & Healthcare Epidemiology 2023;3(Suppl. S2):s41

doi:10.1017/ash.2023.273

Presentation Type:
Poster Presentation - Poster Presentation
Subject Category: Antibiotic Stewardship

Examining the effects of organizational influencers on the implementation of clinical innovations: A qualitative analysis

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Background: The FIRST Trial is a 5-year study funded by the Agency for Healthcare Research and Quality. Our investigation is situated within a more extensive study to restrict fluoroquinolone antibiotics by requiring providers to obtain authorization from an infectious disease physician before prescribing fluoroquinolones. Our research team is performing a systematic evaluation to identify organizational characteristics and influencers of the fluoroquinolone preprescription authorization implementation process to understand variables that may facilitate or hinder implementation success. **Methods:** To address this critical gap, we present a qualitative analysis from our ongoing, multisite research project aimed at systematically assessing the adoption of an antimicrobial stewardship intervention in the form of an EHR-integrated best-practice alert (BPA) at each site to identify work system factors that impact uptake and variability in the implementation of the BPA at each location. The evaluation provides a detailed explanation of activities through the implementation

process (eg, before implementation, during implementation, and after implementation) to assess how an organization effectively negotiates the phases and transitions, ultimately influencing the impact of the intervention. We have used a contextual determinant framework (CFIR) that has enabled us to perform a systematic and comprehensive exploration and identification of potential explanatory themes or variables to shed light on the complex social phenomenon of implementation. **Results:** Participants who will be a part of our poster presentation will learn about implementing a BPA, the potential barriers to implementation, and strategies for overcoming these barriers. Stakeholders within our study include site coordinators, medical doctors, nurses, pharmacists, and clinical informaticists. Our analysis synthesizes their experiences implementing and sustaining this evidence-based antimicrobial stewardship intervention. It includes (1) a detailed description of the process of change, (2) work-system factors (eg, inner setting and outer setting) that they believe influenced the success of the intervention, (3) barriers and facilitators (eg, CFIR constructs) within the implementation process; and (4) description of how these could have influenced the outcomes of interest (eg, implementation and intervention effectiveness). **Conclusions:** Our research is expected to advance patient safety research and initiatives by providing a more robust approach to performing systematic intervention evaluations. By outlining stakeholders' experiences within our study, implementation leaders within healthcare systems will utilize our findings to aid them in their design and implementation process when designing and implementing similar types of healthcare interventions.

Disclosures: None

Antimicrobial Stewardship & Healthcare Epidemiology 2023;3(Suppl. S2):s41–s42
doi:10.1017/ash.2023.274

Presentation Type:
Poster Presentation - Poster Presentation
Subject Category: Antibiotic Stewardship
Antimicrobial stewardship during COVID-19: An analysis of culture negative patients receiving extended antimicrobial agents
Swetha Srialluri; Curtis Collins and Holly Murphy

Background: COVID-19 is associated with symptoms, clinical findings, and laboratory abnormalities that raise concern for secondary infections. Excess antimicrobial use despite low rates of secondary infections has been reported and presents a continuing challenge for antimicrobial stewardship programs (ASPs), particularly during COVID-19 surges. The objective of this study was to analyze the appropriateness of antimicrobial use in patients with extended antimicrobial therapy during 2 distinct COVID-19 hospital surges. **Methods:** We conducted an observational, retrospective, cohort study of COVID-19 patients admitted to our 548-bed community teaching hospital between November and December 2021 (ie, the SARS-CoV-2 delta-variant predominant phase) and January–February 2022 (ie, the SARS-CoV-2 omicron-variant predominant phase) and who received antibiotics for >4 days without positive cultures. Demographic and clinical data were obtained from the institutional data warehouse. Infectious diseases–trained researchers evaluated the appropriateness of antimicrobials based on diagnostic and clinical reporting and institutional antimicrobial stewardship guidelines. Patients were considered to have probable secondary bacterial infection if they had 2 of the following symptoms: fever, unexplained leukocytosis, worsening secretions, or hypoxia and/or imaging. The outcomes of interest included confirmed infections and excess antimicrobial days. Categorical and continuous variables were analyzed using χ^2 tests, Fisher exact tests, and Mann-Whitney U tests, respectively. Statistical significance was defined as $P \leq .05$. **Results:** In total, 87 patients were included in the study. Moreover, 56 patients were identified in the SARS-CoV-2 delta-variant predominant phase and 31 patients were identified in the SARS-CoV-2 omicron-variant predominant phase. The groups were similar, with higher vaccination rates in the SARS-CoV-2 omicron-variant predominant group (37.5% vs 64.5%; $P = .016$). Patients in the SARS-CoV-2 omicron-variant predominant group required less mechanical ventilation (39.3% vs 16.1%; $P = .025$). There were no significant differences in infectious diseases consultation, immunomodulator or remdesivir use, antimicrobials classes prescribed, or antimicrobial days of therapy or duration between cohorts. There were no significant differences in length of stay, 30-day mortality, or 30-day readmissions. Infections were confirmed in 78.6% in the delta-variant group versus 83.9% in the omicron-variant group ($P = .55$). Pneumonias accounted for 60.7% in the delta-variant group and 40.9%, in the omicron-variant group. Excess antibiotic use occurred in 14.3% of patients in the delta-variant group and in 3.1% of patients in the omicron-variant group ($P = .149$). There was no significant difference in the duration of inappropriate antimicrobial use between groups in patients without infections: 5 days in the delta-variant group versus 5 days in the omicron-variant group ($P = .24$). **Conclusions:** Results demonstrated that most antimicrobial use was appropriate in a challenging patient population lacking positive cultures to guide therapy. Inappropriate antimicrobial utilization occurred demonstrating continued opportunities for our institutional ASP.

Disclosures: None

Antimicrobial Stewardship & Healthcare Epidemiology 2023;3(Suppl. S2):s42
doi:10.1017/ash.2023.275

Presentation Type:
Poster Presentation - Poster Presentation
Subject Category: Antibiotic Stewardship
Diagnostic accuracy of antibiograms in predicting the risk of antimicrobial resistance for individual patients
Shinya Hasegawa; Jonas Church; Eli Perencevich and Michihiko Goto

Background: Many clinical guidelines recommend that clinicians should use antibiograms to decide on empiric antimicrobial therapy. However, antibiograms aggregate epidemiologic data without consideration for any other factors that may affect the risk of antimicrobial resistance (AMR), and little is known about an antibiogram's reliability in predicting antimicrobial susceptibility. We assessed the diagnostic accuracy of antibiograms as a prediction tool for *E. coli* clinical isolates in predicting the risk of AMR for individual patients. **Methods:** We extracted microbiologic and patient-level data from the nationwide clinical data warehouse of the Veterans Health Administration (VHA). We assessed the diagnostic accuracy of the antibiogram for 3 commonly used antimicrobial classes for *E. coli*: ceftriaxone, fluoroquinolones, and trimethoprim-sulfamethoxazole. First, we retrospectively generated facility-level antibiograms for all VHA facilities from 2000 to 2019 using all clinical culture specimens positive for *E. coli*, according to the latest Clinical & Laboratory Standards Institute guideline. Second, we created a patient-level data set by including

Figure 1. Receiver operating characteristic curves for prediction of antibiograms for ceftriaxone, fluoroquinolones, and trimethoprim-sulfamethoxazole.
Abbreviations: AU-ROC, area under the receiver operating characteristic curve; Sn, sensitivity; Sp, specificity.

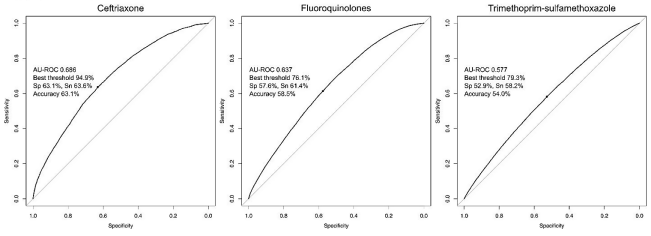

Figure 2. The diagnostic performance of the three major antimicrobial groups for *E. coli*.
(Footnote) Data presented as %. Abbreviations: Ac, accuracy; Sn, sensitivity; Sp, specificity.

E. coli	Prevalence of Susceptibility	Threshold														
		80%			85%			90%			95%			98%		
		Sn	Sp	Ac	Sn	Sp	Ac	Sn	Sp	Ac	Sn	Sp	Ac	Sn	Sp	Ac
Ceftriaxone	94.7	2.9	99.6	94.4	6	98.9	94.0	10.8	97.5	92.9	65.0	61.4	61.6	100	0	5.3
Fluoroquinolones	76.6	76.4	42.2	50.2	91.8	22.8	38.9	98.8	7.2	28.6	100	0	23.4	100	0	23.4
Trimethoprim-sulfamethoxazole	79.1	64.9	45.9	49.9	93.7	11.4	28.6	100	0.1	21.0	100	0	20.9	100	0	20.9