Presentation Type:
Poster Presentation - Oral Presentation
Subject Category: Antibiotic Stewardship
Factors associated with antimicrobial drug prescription among inpatient dogs and cats at an academic veterinary hospital
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Background: Widespread antimicrobial use in dogs and cats drives antimicrobial resistance in both animals and humans. Knowledge of the factors associated with antimicrobial use is limited in veterinary medicine. We examined factors associated with antimicrobial drug prescription among inpatient dogs and cats at an academic veterinary hospital. **Methods:** A veterinary-adapted observational medical outcomes partnership common data model was utilized to extract demographic, clinical, and prescription data from the electronic medical record system in this descriptive observational study. Using generalized estimating equations, we assessed the association between demographic and clinical factors and systemic antimicrobial drug prescription among inpatient dogs and cats at a small-animal teaching hospital between 2018 and 2020. **Results:** Across 11,685 dogs with 14,328 admissions (mean age, 7.4 years; 47% females), the following factors were associated with increased odds of any antimicrobial drug prescription: female, longer admission, a history of chemotherapy within 30 days of hospital admission, surgery upon admission or within the last 30 days, urinary catheterization, ICU admission, and oxygen support. In 3,371 cats with 4,088 admissions (mean age, 8.6 years; 39% females), the following factors were associated with increased odds of any antimicrobial drug prescription: female, longer admission, increased age (>8 years), admission into the ICU, surgery upon admission, and feline that did not require oxygen support or urinary catheterization. **Conclusions:** This study identifies multiple patient and clinical factors associated with increased risk of antimicrobial drug use in inpatient dogs and cats that can inform veterinary antimicrobial stewardship efforts and may be useful for antimicrobial use benchmarking on an institutional or multi-institutional scale.
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Prior cultures predict subsequent susceptibility in patients with recurrent urinary tract infections
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Background: Patients with recurrent urinary tract infections (rUTI) experience frequent exposure to antimicrobial regimens, leaving them at higher risk for developing antibiotic resistance. Little information on the prevalence of antibiotic resistance among patients with rUTI has been published. Although the IDSA recommends using a prior culture to guide empiric treatment, studies have not examined the predictive ability of a prior culture among patients meeting rUTI criteria. We constructed an antibiogram and evaluated test metrics, including sensitivity, specificity, and positive predictive value (PPV) and negative predictive values (NPV) of a prior culture (any organism), on predicting resistance (PPV) or susceptibility (NPV) of a future culture among patients with uncomplicated rUTI in an outpatient setting. **Methods:** We retrospectively extracted electronic health record data from outpatients aged ≥18 years who had an ICD-10 code for cystitis listed twice in 6 months or thrice in 12 months between November 1, 2016, and December 31, 2018. Patients sought care at either urology or primary care practices within an academic medical center in Houston, Texas. Patients with functional or structural abnormalities of the genitourinary tract, signs or symptoms of pyelonephritis, or pregnancy were excluded. Antibiogram data were reported for uropathogens with ≥30 isolates, and intermediate results were considered resistant. Test metrics and Bayes' PPV and NPV were calculated using standard formulas. **Results:** We included 597 visits from 232 unique patients. Most were White (63%) and female (92%), and the cohort had a median age of 58 (IQR, 41–68). Among 310 rUTI episodes with a urine culture, 189 (61%) had at least 1 uropathogen isolated, and *Escherichia coli* (n = 130, 66%) was most common among all 196 uropathogens. *E. coli* isolates had >20% resistance to 10 of 18 antibiotics (Fig. 1). *E. coli* resistance to ciprofloxacin was 27.9%, resistance to nitrofurantoin was 5.5%, and resistance to trimethoprim-sulfamethoxazole was 38.0%. The PPVs for predicting resistance were highest for ceftriaxone (0.86; 95% CI, 0.60–0.96), ciprofloxacin (0.84; 95% CI, 0.63–0.94), and levofloxacin (0.84; 95% CI, 0.63–0.94). NPVs of resistance were highest for gentamicin (0.97; 95% CI, 0.83–1.00), ceftriaxone (0.94; 95% CI, 0.86–0.98), and cefepime (0.94; 95% CI, 0.84–0.98), whereas NPVs for cefuroxime, ciprofloxacin, levofloxacin, and nitrofurantoin were all >0.83. **Conclusions:** We detected considerable antibiotic resistance among patients with rUTI to commonly prescribed antibiotics. Prior urine culture susceptibility demonstrated moderate-to-high PPVs for predicting future resistance to ceftriaxone and fluoroquinolones as well as high NPVs for several cephalosporins and fluoroquinolones, which could inform empiric prescribing choices.

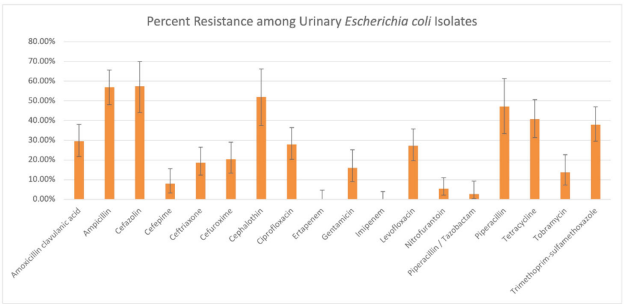

Fig. 1.

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The effect of gender bias on acceptance of antibiotic stewardship recommendations by clinical pharmacists
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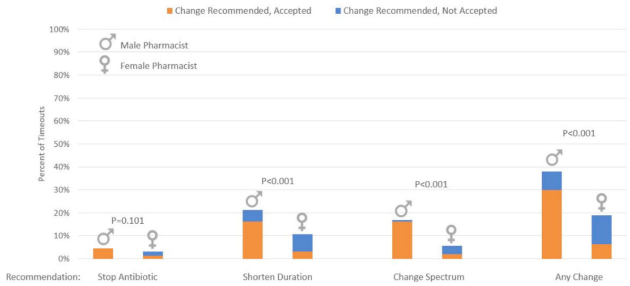
Background: Clinical pharmacists are a critical part of antibiotic stewardship. Stewardship often relies on relationships and persuasion, which may be affected by gender bias. Thus, we aimed to assess the association of sex with the acceptance of antibiotic stewardship recommendations. **Methods:** Between May and October 2019, medicine pharmacists at single hospital reviewed patients on antibiotics and—when a discharge was anticipated—led an antibiotic discussion (or "timeout") prior to discharge. To explore differences in antibiotic timeout effectiveness by gender, we assessed the association of pharmacist sex with suggestion and acceptance of antibiotic changes using logistic regression controlling for patient characteristics. We also assessed whether hospitalist sex was associated with or moderated the effect of pharmacist sex on acceptance of timeout recommendations. **Results:** Between May 1, 2019, and October 31, 2019, pharmacists conducted 295 timeouts (patient characteristics in Fig. 1). Overall, 54% of timeouts were conducted by 12 female pharmacists and the remaining 46% were conducted by 8 male pharmacists. Overall, 82 (29%) of 295 timeouts resulted in a pharmacist recommending an antibiotic change, and male pharmacists were more likely to recommend a change: 52 (38%)

Figure 1. Patient Characteristics

Patient Characteristics	All Timeouts (N=295)	Male Pharmacists (n=137)	Female Pharmacists (n=158)	P-value[a]
Age (years), mean (SD)	64 (16)	67 (15)	62 (17)	0.01
Female Sex, N (%)	152 (51%)	65 (48%)	87 (55%)	.19
Charlson Comorbidity Index, median (IQR)	5 (2, 8)	5 (2, 8)	6 (3, 8)	.15
qSOFA score at 0-24h[b], median (IQR)	1 (0-2)	1 (0-2)	1 (0-2)	.71
Length of hospital stay (days), median (IQR)	4 (3, 7)	5 (3, 7)	4 (3, 6)	.27
Infectious disease treated, N (%)				
Urinary Tract Infection	83 (28%)	35 (26%)	48 (30%)	.39
Pneumonia	84 (28%)	46 (33%)	38 (24%)	
Skin and soft tissue	42 (14%)	16 (12%)	26 (16%)	
Bacteremia, Osteomyelitis, Other	49 (17%)	23 (17%)	26 (16%)	
Intra-abdominal or CDI	37 (13%)	17 (12%)	20 (13%)	
Infectious diseases consultation during hospitalization, N (%)	72 (24%)	32 (23%)	40 (25%)	.70
Had an antibiotic prescribed on discharge, N (%)	256 (87%)	110 (80%)	146 (92%)	<0.001
Antibiotic discharge duration (days); median (IQR)	5 (3, 10)	5 (3, 9)	6 (3-10)	.19

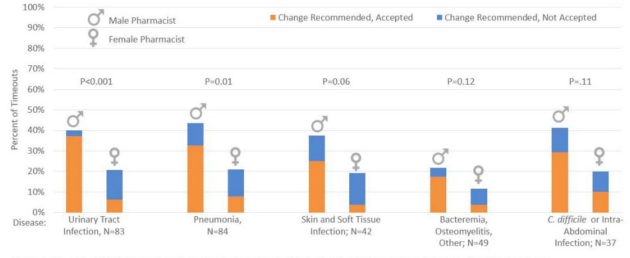
Figure shows patient characteristics of antibiotic timeouts conducted by male vs. female pharmacists.
[a] Differences in patient characteristics between men and women pharmacists were evaluated using Pearson's chi squared or t-tests, as appropriate. P<0.05 considered significant.
[b] Quick sequential organ failure assessment score (qSOFA) identifies patients outside of the intensive care unit who have a high predicted risk of sepsis-related mortality
Abbreviations: SD, standard deviation; CDI, *Clostridioides difficile* infection

Figure 2. Antibiotic Timeouts with Change Recommended and Accepted, by Type of Recommendation N=295 Timeouts



The percentage of antibiotic timeouts performed by male vs. female pharmacists that had a change recommended but not accepted vs. recommended AND accepted are shown. P-values, calculated using chi-squared tests, are shown for the overall success (percent where recommendation was accepted) of antibiotic timeouts by gender.

Figure 3. Antibiotic Timeouts Recommendations and Acceptance, By Disease N=295 Timeouts



The percentage of antibiotic timeouts performed by male vs. female pharmacists that had a change recommended but not accepted vs. recommended AND accepted are shown by disease state. P-values, calculated using chi-squared tests, are shown for the overall success (percent where recommendation was accepted) of antibiotic timeouts by gender. Abbreviations: *C. difficile*, *Clostridioides difficile*

of 137 versus 30 (19%) 158 (P **Conclusions:** In this discharge antibiotic intervention, timeouts conducted by women were less likely to result in an antibiotic change than those conducted by men. The difference in effectiveness resulted both from female pharmacists being less likely to recommend a change and from hospitalists being less likely to accept recommendations from a female pharmacist. These findings suggest that gender bias may play a role acceptance of antibiotic stewardship recommendations, which could affect antibiotic use, pharmacist job satisfaction, and patient outcomes.

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Identifying symptoms/illnesses and situations that predispose outpatients to use antibiotics in two healthcare systems

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Background: Taking antibiotics outside the guidance of a clinician (nonprescription use) is a potential safety issue and runs counter to antibiotic stewardship efforts. We identified the symptoms and illnesses and situations that may predispose patients to take antibiotics, and we compared these findings between patients attending public primary care clinics and private emergency departments. **Methods:** A cross-sectional survey was conducted between January 2020 and March 2021 in 6 primary care clinics and 2 emergency departments in the United States. We queried patients about 5 symptoms and illnesses (Fig. 1) and 14 situations (Fig. 2) to investigate whether these would lead the patients to take antibiotics without a prescription. We used the χ^2 test to compare the symptoms and illnesses and situations between the respondents from public and private healthcare systems. We set the *P* value for significance at <.025. **Results:** In total, the survey had 564 respondents (median age, 49.7 years; range, 19–92), and 72% were female. Most respondents identified as either Hispanic or Latina/Latino (46.6%) or African American or Black (33%), followed by White (15.8%), and other (4.6%). Most respondents had visited public clinics (72%). The most common insurance status for our respondents included Medicaid or county financial assistance program (56.6%), followed by private insurance or Medicare (36.7%) and self-pay (6.7%). In public primary care clinics, only 23% had private insurance or Medicare compared to 72.9% in private emergency departments. Of those surveyed, 69% agreed that antibiotics would improve the recovery from sinus infections, followed by bronchitis (64%), sore throat (64%), cold/flu (61.4%), and diarrhea (31.5%). The proportions of respondents who believed that antibiotics would improve the recovery from diarrhea (36.2% vs 19.4%; $P = .004$) and sore throat (59.9% vs 48.4%; $P < .001$) were significantly higher among public versus private outpatient respondents. We did not find significant differences for cold/flu, sinus infection, or bronchitis between these 2 healthcare systems (Fig. 1). In 11 of the 14 situations, patients in public clinics were more likely to report a likelihood of using nonprescription antibiotics than the patients visiting the private emergency rooms (Fig. 2). **Conclusions:** Future stewardship interventions should be aware of the symptoms and illnesses and situations that may

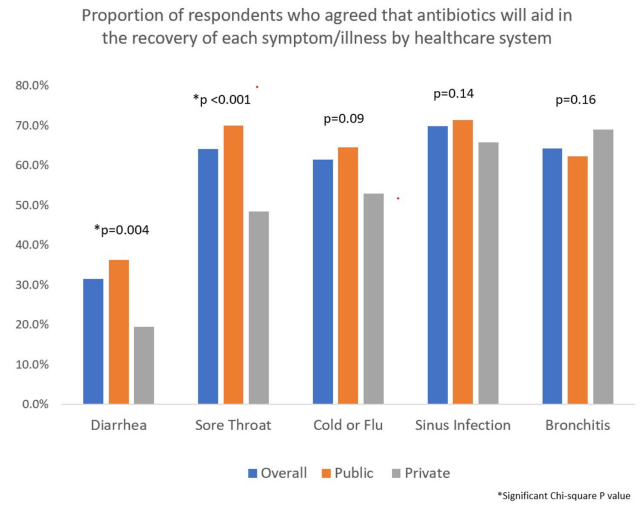

Fig. 1.