

study to demonstrate that EI piperacillin/tazobactam dosing significantly reduces rates of AKI in patients on concomitant vancomycin.

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61. Evaluation of the Impact of a Micafungin Time-Out Protocol for Hospitalized Patients

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Session: P-3. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background: Echinocandin overuse is associated with increased prevalence of non-*albicans* *Candida* spp, resistance, and high costs. Prospective review of micafungin prescribing by an Antimicrobial Stewardship Pharmacist (ASP) has shown reduced rates of inappropriate therapy. The aim of this study was to describe ASP's interventions following introduction of a micafungin time out (MTO) protocol.

Methods: The approved MTO protocol was implemented in November 2019. Active micafungin orders for hospitalized patients were reviewed Monday through Friday at initiation and on day five. The MTO algorithm assessed micafungin use based on patient risk factors for *Candida* infection and de-escalation was guided by clinical status, culture data, and susceptibility testing. Micafungin use and ASP's interventions were reviewed post-implementation between 12/01/2019 and 02/29/2020. Micafungin use was also characterized between 12/01/2018 and 02/28/2019 to serve as a control.

Results: A random sample of 50 patients who received micafungin for ≥ 48 hours during the pre- and post- protocol periods were included. 39 (78%) and 38 (76%) patients in the pre- and post-MTO cohort had indications for micafungin initiation according to algorithm. In the post-MTO group, 9 (75%) of the 12 micafungin initiations outside of algorithm approval were intervened on successfully by the ASP, increasing appropriate antifungal therapy to 47 (94%) patients. On day five, 18 (50%) and 25 (65.8%) (p=0.17) micafungin orders were according to algorithm in the pre- and post-MTO groups, respectively. Culture data on day five revealed 18 (50%) in the pre-MTO and 13 (34.2%) in the post-MTO group were eligible for de-escalation. An ASP-initiated MTO on day five identified 23 opportunities for antifungal therapy optimization in the post-MTO group. Interventions included de-escalation (13; 61.9%), discontinuation (6; 28.6%), and dose optimization (4; 19%). Of the 23 ASP interventions on day 5, 10 (43.4%) led to micafungin discontinuation or de-escalation, increasing the overall antifungal appropriateness to 35 (92.1%) patients.

Conclusion: An ASP-initiated MTO can facilitate appropriate and timely optimization of antifungal therapy. The most frequent interventions were de-escalation from micafungin or therapy discontinuation.

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62. Factors Associated with 30-Day ED Readmission Following Initial ED Discharge for Suspected Sepsis

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Session: P-3. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background: Given the increased mortality associated with delayed recognition of sepsis, emergency departments (ED) often use protocols to rapidly identify and treat suspected sepsis. However, screening criteria such as systemic inflammatory response syndrome (SIRS) lack specificity and may over-diagnose sepsis in patients otherwise stable for discharge. Our study describes outcomes and identifies factors associated with ED readmission in those initially discharged directly from the ED who met sepsis criteria.

Methods: This retrospective cohort study evaluated adult patients (≥ 18 years) seen in the ED at UTSW Medical Center from January to June 2018 who met all the following: ≥ 2 SIRS criteria; received ≥ 1 dose of intravenous (IV) broad-spectrum antibiotic(s) in the ED; were discharged home. A multivariable logistic regression model identified factors associated with 30-day re-admission to our ED, using clinically significant variables parsimoniously. A two-sided P value < 0.05 was considered significant.

Results: A total of 179 patients were included. Forty-four patients (25%) returned to the ED within 30 days of their initial visit; of those 44, 63.6% (28) returned for issues related to their prior visit, and 50% (22) were admitted to the hospital. Table 1 compares baseline demographics of patients with suspected sepsis readmitted to the ED with those not readmitted within 30 days after initial ED discharge. In univariable analysis, quick Sequential Organ Failure Assessment (qSOFA), and length of antibiotic therapy (ED plus discharge antibiotics) were associated with ED re-admission (table 1). Receipt of antibiotics on discharge was not significant. In the final multivariable analysis (table 2), initial qSOFA ≥ 2 alone was associated with increased risk of ED re-admission (OR 7.5, p=0.01).

Table 1. Baseline demographics of patients readmitted and not readmitted to the ED within 30 days after ED discharge with suspected sepsis

Group	Readmitted to ED within 30 d (n = 44)	Not readmitted within 30 d (n = 135)	p-value
Age, years, median (IQR)	48 (30-59)	51 (36-65)	0.21
Male, n (%)	15 (34.1)	48 (35.6)	0.86
Race, n (%)			0.50
White	12 (27.3)	48 (35.6)	--
Black	19 (43.2)	47 (34.8)	--
Hispanic	9 (20.5)	33 (24.4)	--
Other	4 (9.1)	7 (5.2)	--
Chemotherapy within 30 d, n (%)	9 (20.5)	16 (11.9)	0.15
SOT or HCST transplant, n (%)	9 (20.5)	17 (12.6)	0.20
Immunosuppression, n (%)	1 (2.3)	6 (4.4)	0.52
SIRS criteria on initial ED admission, n (%)			0.46
2	28 (63.6)	94 (69.6)	--
3	13 (29.5)	48 (25.9)	--
4	3 (6.8)	6 (4.4)	--
Quick SOFA score on initial ED admission, n (%)			0.01
0	19 (43.2)	82 (60.7)	--
1	19 (43.2)	49 (36.3)	--
2	6 (13.6)	4 (2.9)	--
>2	0	0	--
Confirmed bacterial infection at initial ED admission, n (%)	7 (15.9)	28 (20.7)	0.48
Suspected bacterial infection at initial ED admission, n (%)	20 (45.5)	60 (44.4)	0.91
Absence of bacterial infection at initial ED admission, n (%)	17 (38.6)	47 (34.8)	0.65
Length of total antibiotic therapy at initial ED admission, days, median (IQR)	6 (1-8)	8 (1-11)	0.03
Discharged on antibiotics at initial ED admission, n (%)	26 (59.1)	98 (72.6)	0.09
Site of infectious diagnosis, n (%)			0.14
Respiratory	13 (29.6)	34 (25.2)	--
Skin	4 (9.1)	8 (5.9)	--
Abdominal	4 (9.1)	15 (11.1)	--
Genitourinary	12 (27.3)	62 (45.9)	--
Central nervous system	0 (0)	1 (0.7)	--
Other	11 (25.0)	15 (11.1)	--

Table 2. Multivariable logistic regression of risk factors for patients readmitted and not readmitted to the ED within 30 days after ED discharge with suspected sepsis

Variable	OR (95% CI)	p-value
Quick SOFA score on initial ED admission		
0	Reference	--
1	1.63 (0.78-3.46)	0.26
2	7.50 (1.85-30.39)	0.01
Discharged on antibiotics at initial ED admission	0.57 (0.27-1.19)	0.14
Chemotherapy within 30 d	2.05 (0.81-5.18)	0.13
SOT or HCST transplant	1.92 (0.75-4.88)	0.17

Conclusion: In this cohort, 25% of patients with suspected sepsis initially discharged from the ED were readmitted to our ED within 30 days. A qSOFA ≥ 2 at the initial ED visit was associated with increased risk of readmission, suggesting a potential use of qSOFA to triage those warranting admission or closer follow-up. Larger prospective studies are warranted in this understudied population of patients who meet screening sepsis criteria but are discharged from the ED.

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63. Frequency and Outcomes of Patients Prescribed Antibiotics for Extended Durations on Discharge from the Hospital to Nursing Homes

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Session: P-3. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background: Nursing home (NH) residents are at increased risk of being prescribed antibiotic for extended durations and experiencing antibiotic-associated adverse events. However, many of these antibiotics are prescribed in the hospital prior to NH admission. We quantified the frequency, characteristics and outcomes of patients receiving antibiotic treatment in the hospital and discharged to NHs with an antibiotic prescription for greater than 7 days.

Methods: This was a retrospective cohort study of adult (age >18 years) patients with a prescription for an antibiotic on discharge from Oregon Health & Science University Hospital (OHSU) to a NH between January 1, 2016 and December 31, 2018. Study data were collected from an electronic repository of patients' electronic health record data. Outcomes of interest included having an emergency department (ED) visit, inpatient hospital admission, or inpatient admission for *Clostridioides difficile* infection (CDI) at the index facility within 30 days of discharge.

Results: Among 2969 antibiotic prescriptions on discharge, 1267 (42.7%) were prescribed for greater than 7 days to a total of 1059 patients. A diagnosis of a bacterial infection was present for 902 (85.2%) patients. The most frequent diagnoses were bloodstream/endocarditis (21.8%), osteomyelitis (11.6%), and skin and soft tissue infections (10.6%). The most frequently prescribed antibiotics were cephalosporins (24.2%), penicillins (14.1%), glycopeptides (12.9%), and fluoroquinolones (12.6%). Of the 1059 identified patients, 126 (11.9%) had an ED visit, 216 (20.4%) inpatient admission, and 16 (1.5%) had an admission for CDI within 30 days of discharge.

Conclusion: More than 40% of antibiotic prescriptions on discharge to a NH were for greater than 7 days. This frequency and associated poor outcomes suggest extended antibiotic duration are a high-value target to improve antibiotic prescribing on discharge to NHs.

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64. Impact of a Duration Bundle on Antimicrobial Use in a Pediatric Hospital

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Session: P-3. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background: Limiting antibiotic durations to the shortest effective duration is a strong recommendation with moderate-quality evidence in the 2016 IDSA Antimicrobial Stewardship Program (ASP) guidelines. An ASP bundle including a decrease in antimicrobial automatic stop dates from 14 days to 10 days along with a guideline for standard durations for 48 specific indications was implemented at a tertiary pediatric hospital in November 2019. The purpose of this review and was to assess the impact of this ASP initiative on patient outcomes and hospital cost-savings by comparison of pre-intervention and post-intervention data.

Methods: A set of antimicrobial duration recommendations for pediatric patients was created by the Antimicrobial Stewardship Program, Pediatric Hospital Medicine providers, and Infectious Disease providers specific to indication, agent, or pathogen. After education of medical care providers and distribution of the recommendations, automatic stop dates in the Electronic Medical Record (EMR) were updated from 14 days to 10 days for all antimicrobials. Concomitant advertising campaigns were shown on all hospital screensavers. Data were collected for a one month pre-intervention period of Nov.15 - Dec.15, 2018 including 133 patients and a one month intervention period of Nov.15 - Dec.15, 2019 including 125 patients.

Results: The average length of stay decreased from an average of 8.3 days pre-implementation to 6.7 days (p=0.043) post implementation. The ratio of actual to recommended duration also decreased from 1.56 to 1.30 (p<0.001) when comparing pre vs. post initiative. Balancing measures did not change for restarting treatment within 48 hours of stopping or readmission within 30 days for the same infection. The decrease in inpatient therapy translated to more than \$10,000 per year in direct drug cost.

Conclusion: This intervention led to a significant reduction in average length of stay per admission and significantly reduced the secondary outcomes of the total duration of antimicrobial therapy and the ratio of actual duration compared to recommended duration. This led to cost savings and decreased inappropriate antibiotic exposure.

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65. Impact of a Multifaceted Stewardship Intervention on Oral Fosfomycin Prescribing for Treatment of Resistant Organisms in Cystitis

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Session: P-3. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background: Fosfomycin is an oral antibiotic with activity against multi-drug resistant (MDR) bacteria that is recommended as first line treatment for cystitis. The ability to use an oral agent for these infections will be beneficial due to the decreased need for hospitalizations and clinic visits to manage IV therapy; therefore, reducing healthcare exposure for the patient.

Methods: This was a multi-site, observational study evaluating adult patients with a urine culture growing extended-spectrum beta-lactamase *E. coli*, vancomycin-resistant *Enterococcus*, or fluoroquinolone-resistant *Pseudomonas* urinary isolates and with documented cystitis between September - November 2018 (pre-implementation) and September - November 2019 (post-implementation). The primary outcome was the difference in the rate of fosfomycin use pre and post implementation of multiple stewardship interventions (routine fosfomycin susceptibility reporting on MDR organisms, creation of a fosfomycin order set and provider education).

Results: Of 306 patients reviewed, 148 patients met eligibility criteria (68 pre, 80 post). The majority of patients were female (80%), diagnosed with complicated UTI (82%), treated outpatient (88%), and with ESBL *E. coli* as the causative pathogen (91%).

There was a significantly higher rate of fosfomycin use post-intervention (pre 1.5% vs. post 20%, p<0.001). No difference was seen between groups in the rates of use of all other antibiotic classes. The most common antibiotic prescribed for empiric or definitive therapy was nitrofurantoin (empiric 43%, definitive 53%). Appropriate fosfomycin dosing was low in both groups (pre 9% vs. post 19%; p > 0.99). There was no difference in the rate of adverse reactions (pre 4% vs. post 5%, p > 0.99).

Conclusion: There was an increase in fosfomycin use after incorporating a multifaceted stewardship intervention. Fosfomycin provides an alternative oral option for MDR urinary isolates and was not shown to be associated with an increase in adverse effects. This was a simple stewardship intervention which made a measurable impact on antimicrobial use. Additional education for providers and pharmacists regarding appropriate dosing could be considered in the future to promote optimal use.

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66. Impact of a Pharmacist-Driven Azithromycin De-escalation Protocol for Community-Acquired Pneumonia

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Session: P-3. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background: Ceftriaxone and azithromycin are common empiric antibiotics for community-acquired pneumonia (CAP). Despite low suspicion for atypical infection, azithromycin is often continued for a full course. Negative laboratory data for atypical bacteria may assist with azithromycin de-escalation. Thus, a pharmacist-driven azithromycin de-escalation protocol was implemented for immunocompetent, non-intensive care unit (ICU) patients treated for CAP. The primary outcome was to compare azithromycin duration before and after protocol implementation. Secondary outcomes included hospital length of stay (LOS) and all-cause 30-day readmission.

Methods: This was a single-center, quasi-experimental study of hospitalized, non-ICU patients treated with azithromycin and a beta-lactam for CAP. The pre- and post-intervention cohorts were from 07/01/2018-04/30/2019 and 07/01/2019-04/30/2020, respectively. Patients were included if they were ≥18 years old, diagnosed with CAP, and had a negative *Legionella pneumophila* urinary antigen and negative nasopharyngeal swab PCR for *Mycoplasma pneumoniae* and *Chlamydia pneumoniae*. Patients were excluded if they were immunocompromised, admitted to an ICU, prescribed azithromycin for an alternative indication, or had evidence of atypical bacteria.

Results: After exclusion criteria were applied, 90 and 100 patients were included in the pre- and post-intervention cohorts, respectively. Demographic and clinical characteristics were mostly similar between cohorts. This initiative was associated with a statistically significant decrease in azithromycin duration (2 days (IQR 1-2.75) vs. 5 days (IQR 3-6), p < 0.001) and hospital LOS (3 days (IQR 2-5) vs. 5 days (IQR 3-8.25), p < 0.001). No statistically significant difference was observed for all-cause 30-day readmission (14 days (15.6%) vs 13 days (13.0%), p=0.614).

Conclusion: Implementation of a pharmacist-driven azithromycin de-escalation protocol for CAP was associated with reduced azithromycin duration and hospital LOS, but not all-cause 30-day readmission.

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67. Impact of a Pharmacist-Driven Collaborative Initiative on Staphylococcus aureus Bacteremia Management

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Session: P-3. Antimicrobial Stewardship: Outcomes Assessment (clinical and economic)

Background: Infectious diseases (ID) consultation has been associated with improved outcomes for *Staphylococcus aureus* bacteremia (SAB) largely by providing guidance to follow widely accepted standards. However, ID consultation may be delayed due to numerous factors. ID pharmacists may be able to facilitate timely and optimal management of SAB in collaboration with ID providers and microbiology. The primary outcome of this study was to evaluate the impact of a pharmacist-driven collaborative initiative for SAB.

Methods: This was a single-center, quasi-experimental study of patients with SAB before (8/1/16-7/31/17) and after (8/1/18-7/31/19) implementation of pharmacist-driven collaborative initiative for SAB management. After direct notification of SAB and penicillin-binding protein assay results from microbiology personnel, the ID pharmacist promptly contacted the primary team to facilitate ID consultation