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Background. Performing urinalyses and urine cultures in asymptomatic patients is one of the most common reasons for inappropriate antibiotic use. However, de-implementing this practice has been difficult, especially for clinical scenarios deemed to be high risk for infectious complications, such as among patients with delirium or those undergoing orthopedic implant surgery.

Methods. Using the dual-process theory framework "Developing De-Implementation Strategies Based on Un-Learning and Substitution," an educational intervention citing new IDSA guidelines and providing a pneumonic "ABCs of ASB" was created and delivered didactically to providers. The goal was to increase performance of evidence-based prevention actions in place of low-value urine screening and treating of asymptomatic patients. Clinical providers and staff (MD, RN, APRN, trainees) in 3 different levels of care (acute inpatient, long-term, and outpatient) were included. A web-based anonymous and confidential pre- and post-question format was delivered to assess influence on provider behavior.

Results. Responses from a range of 250–279 unique providers were collected. For scenario #1 (patient with delirium and a positive urine culture and no other infectious symptoms), the option to give antibiotics was reduced by 45% pre to 4% post, Chi-square $P < 0.01$). For scenario #2 (patient having a knee replacement and positive pre-operative urine culture, no other symptoms) the option to give antibiotics was reduced by the same magnitude (~50%) but a lower absolute number (67% pre and 33% post, chi-square $P < 0.01$). Changes in predicted behavior were similar across levels of care.

Conclusion. Substituting evidence-based practices in place of low-value practices is an appealing framework for influencing provider behavior. Our work demonstrates that education can successfully reduce the intention to use antibiotics for asymptomatic patients with positive urine cultures.

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1054. Impact of Prospective Review and Feedback with Peer Comparison on Carbapenem Utilization by Physicians Practicing at a Community Teaching Hospital
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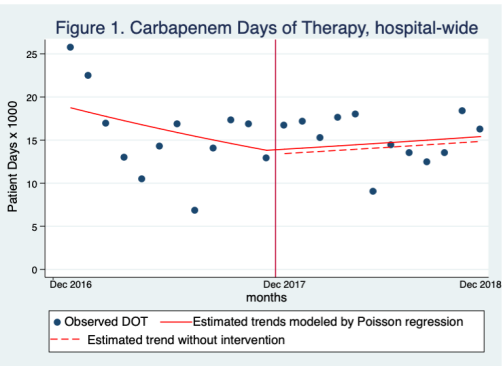
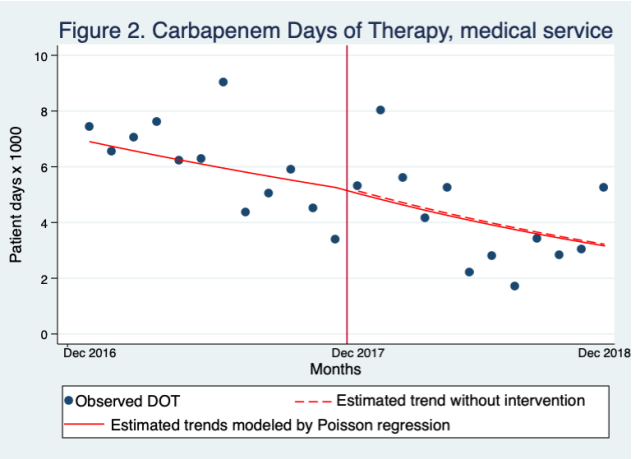
Background. Behavioral interventions such as peer comparison have shown to reduce inappropriate antibiotic utilization in outpatient settings. We aimed to estimate the impact of prospective review and feedback with periodic peer comparison on carbapenem use by physicians in an inpatient setting.

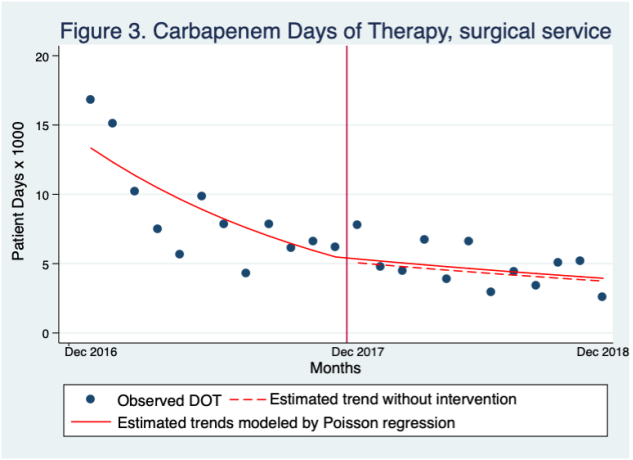
Methods. Interrupted time series study conducted at a 400-bed community teaching hospital with an Antimicrobial Stewardship Program (ASP) in place since 2012. Prospective review and feedback is the ASPs main strategy. Carbapenem use is not restricted. The intervention was limited to internal medicine residents, system-employed hospitalists, critical care specialists, surgery residents and surgery attendings directly supervising residents. Each carbapenem day of therapy (DOT) was reviewed by an infectious diseases (ID) physician or ID pharmacist and classified as adequate, suboptimal unnecessary or inappropriate. For the purposes of peer comparison, each DOT was attributed to the physician directly responsible for patient care on the day a carbapenem was administered. Among patients admitted to teaching services, both the resident and their supervising attending were deemed responsible. Individual physicians' proportions of adequate use were calculated and compared with the aggregate proportion of adequate use by service, i.e., hospitalists were compared with other hospitalists. An email summarizing utilization metrics and comparing to their peers was sent on a monthly basis. The main outcome of interest was hospital-wide carbapenem use measured in DOT per thousand patient-days. Carbapenem DOT use by service was a secondary outcome. Changes in post-intervention trends were calculated as incidence rate ratios (IRR).

Results. Following the onset of the intervention there were no changes in hospital-wide trends of carbapenem use (IRR 1.04; 95% CI 0.98–1.10; $P = 0.21$) (Figure 1). Analysis of carbapenem use by service showed prescribing trends remained stable within services, with IRR in medical service of 0.98 (95% CI 0.92–1.05; $P = 0.61$) and IRR in the surgical service of 1.05 (95% CI 0.99–1.13; $P = 0.11$) (Figures 2 and 3). No changes were seen in proportions of adequate use.

Conclusion. Addition of peer comparison to an ASP utilizing prospective review and feedback did not decrease carbapenem use.







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1055. Addition of Antimicrobial Stewardship Program Weekend Coverage Increases Interventions while Reducing Antimicrobial Duration and Cost
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Background. Expansion of Antimicrobial Stewardship Program (ASP) activities to include coverage of weekends has been shown to facilitate further optimization of antimicrobial usage. Beginning July 2018, we implemented full ASP coverage on weekends from 0700–1530 by infectious diseases (ID) clinical pharmacists and pharmacy residents. We sought to evaluate the impact of the addition of weekend ASP coverage on the number of interventions, antimicrobial duration and cost of target broad-spectrum antimicrobials.

Methods. Antimicrobials reviewed by ASP on a weekend day between July 14, 2018 and December 16, 2018 were included in the analysis. The primary outcome was the number and type of documented interventions associated with the antimicrobials reviewed. Secondary outcomes included the total duration of meropenem, daptomycin, and micafungin initiated on a weekend, estimated expenditures on these target broad-spectrum antimicrobials, and comparison of the average number of interventions performed per day by ID clinical pharmacists vs. pharmacy residents. For comparison, we also evaluated these secondary outcomes prior to ASP weekend coverage, between July 16, 2017 and December 9, 2017.

Results. A total of 688 antimicrobials were reviewed on weekend days during the included time-frame with 753 interventions (average number of interventions/day: 37). Table 1 summarizes the type of interventions. The acceptance rate for interventions was 99%. The average number of interventions per day for ID clinical pharmacists vs. pharmacy residents was 57.9 and 26.2, respectively. Table 2 shows the total duration of therapy (DOT) and total expenditures on target antimicrobials before and after ASP weekend coverage. The total DOT of target antimicrobials agents decreased from 21 days to 7 days, with an estimated 3,165 dollar decrease in expenditures during the included time-frame.

Conclusion. Expansion of ASP coverage to include weekends allowed us to provide 753 interventions over 4 months that would not otherwise have been made when no ASP coverage was available. This was associated with a reduction in broad-spectrum antimicrobial duration of therapy and expenditures when compared with weekends where ASP weekend coverage was not available.

Table 1: Weekend Intervention Summary

Intervention	Number (%)
Optimization of therapy (e.g. dose adjustment, additional agent, alternative agent)	299 (39)
Safety monitoring (e.g. recommended lab monitoring, drug-interaction prevention)	339 (45)
De-escalation	68 (9)
Cost-savings (alternative – less expensive agent, IV-to-PO)	16 (2)
ID consult recommended	31 (4)

Table 2: Duration of Therapy for Target Antimicrobials and Expenditures

Antimicrobial	DOT Pre-ASP Weekend	DOT Post-ASP Weekend
Meropenem	5 days	2 days
Daptomycin	7 days	0 days
Micafungin	9 days	5 days
Total Expenditure (WAC)	$4,879	$1,714

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1056. Evaluation of Clinical Outcomes Following Implementation of Real-Time Stewardship Team Interventions for Multi-Drug-Resistant Organisms

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Background. Infections due to multidrug-resistant organisms (MDRO) are associated with an increased risk of mortality. Accurate assessment of culture results and prompt initiation of effective antibiotic therapy have the potential to improve patient outcomes. The purpose of this study was to assess the time to effective therapy and associated clinical outcomes following the implementation of real-time stewardship alerts for infections due to MDRO.

Methods. This pre–post quasi-experimental study identified patients admitted to Michigan Medicine with a positive culture for one of 14 pre-defined MDRO. An alerting system was implemented within the institution's electronic health record (EHR) in October 2018, which notifies the antimicrobial stewardship (ASP) pharmacist upon detection of an MDRO, regardless of source. The ASP pager is monitored 24/7 by a clinical pharmacy specialist who reviews the patient's chart and recommends antibiotic modifications if necessary. In the pre-intervention period, no structured alerting or assessment was performed. Inclusion: ≥18 years old and trigger of an alert. Exclusions: pediatric service, cystic fibrosis, discharged or deceased prior to alert sensitivities, outside hospital (OSH) transfer growing identical organism upon admission, culture contamination or colonization. The primary outcome of time to effective therapy is determined from time of alert for MDRO to the order time of the effective antimicrobial agent. Secondary outcome measures include: length of stay, 30-day all-cause mortality, and 30-day readmission.

Results. 152 alerts were included in the study (post, n = 75 and pre, n = 77). Outcomes were assessed in patients not on effective therapy at the time of alert (68.0% vs. 70.1%). Time to effective therapy was significantly improved in the intervention group (2.08hours vs. 3.72hours, P = 0.0010). Length of stay (18 days vs. 15.5 days, P = 0.1662) and 30-day all-cause mortality (17.6% vs. 18.5%, P = 0.9088) were not different between groups. However, 30-day readmission rates were significantly reduced with the intervention (21.4% vs. 43.2%, P = 0.0316).

Conclusion. Real-time stewardship team interventions for infections due to MDRO improve time to effective therapy and are associated with a decrease in hospital readmissions.

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1057. The Impact of Temporary Suspensions of an Antimicrobial Stewardship Audit and Feedback Program on Antimicrobial Utilization of General Internal Medicine Inpatients

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Background. A goal of Antimicrobial Stewardship Programs (ASP) is to optimize antimicrobial use; many using audit and feedback (AAF). Although AAF decreases unnecessary target antimicrobial use, it is resource-intensive. As a result, temporary suspensions in AAF activity may occur from human resource limitations or other factors. We describe the impact of these temporary suspensions and intensity of care on antimicrobial utilization trends.

Methods. This retrospective study describes the initiation and temporary suspensions of AAF in the General Internal Medicine (GIM) unit at an urban teaching hospital. Data were collected over 65 months. During active-AAF, a dedicated ID trained clinical pharmacist and ID physician-reviewed antimicrobial use for all GIM patients and provided patient-specific advice to physicians. Antimicrobial use was measured by Defined Daily Doses (DDD) normalized per 1,000 patient-days. To assess the impact of temporary suspensions, data were compared in two ways: 1. All nonactive-AAF time-frames were compared with active AAF 2. Pre-ASP was compared with Post-ASP Initiation which includes suspension periods. To determine whether differences in trends were seen based on acuity level of the patients (identified at admission as benefiting from frequent monitoring), analyses were repeated after stratification of patients admitted to the Step-Up unit (GIM-SU) and the regular ward (GIM-W).

Results. Comparing nonactive AAF vs. active-AAF, significant changes ($P < 0.05$) in mean normalized DDD were observed for total antimicrobials (-19%), antipseudomonals (-21%) fluoroquinolones (–41%) and first-generation β lactams (–30%). Pre ASP vs. Post ASP comparisons showed similar but less pronounced trends. Following stratification to GIM-SU and GIM-W, greater variation in significant changes to targeted antimicrobials between comparisons was observed. Different significant antimicrobial changes were seen in SU vs. W.

Conclusion. Our results show that the temporary suspension of ASP AAF impacts antimicrobial utilization trends. Greater sustained decreases in targeted antimicrobials utilization were associated with active AAF. Stratification by patient acuity lead to increased variation in the impact on target antimicrobials and increased the impact of suspension.

Table 1: Comparision of antimicrobial use in periods of: 1) Non-Active Audit and Feedback (AAF) versus Active AAF 2) Pre-Antimicrobial Stewardship Program (ASP) versus Post ASP Initiation, for all patients admitted GIM ward

Table 1	Comparison 1:			Comparison 2:		
GIM (All)	Non-active AAF	Active AAF (excluding suspensions)	P Value	Pre ASP	Post ASP Initiation (including suspensions)	P value
DDD/1000 pt days						
All antimicrobials (Cumulative)	**1457.8**	**1178.7**	**0.002***	**1466.2**	**1286.0**	**0.049***
Antipseudomonal antibacterials	**345.5**	**273.7**	**0.024***	**358.9**	**288.2**	**0.044***
Anti-MRSA agents	108.3	105.8	0.925	92.8711	123.7	0.181
Fluoroquinolones	**152.7**	**89.1934**	**<0.001***	**173.3**	**91.88**	**<0.001***
Carbapenem	74.1103	52.0478	0.056	61.3608	76.106	0.322
First generation Beta-lactam	**327.9**	**230.4**	**0.027***	287.7	318.0	0.536
Sulfamethoxazole/ Trimethoprim	46.3471	48.958	0.831	50.45	43.10	0.474
Piperacillin / Tazobactam	142.7	131.8	0.642	147.2	131.1	0.515

Table 2: Comparision of antimicrobial use in periods of: 1) Non-Active Audit and Feedback (AAF) versus Active AAF 2) Pre-Antimicrobial Stewardship Program (ASP) versus Post ASP Initiation, for patients admitted to the GIM Step-Up ward (GIM-SU)

Table 2	Comparison 1:			Comparison 2:		
GIM-SU	Non-active AAF	Active AAF (excluding suspensions)	P Value	Pre ASP	Post ASP Initiation (including suspensions)	P value
DDD/1000 pt days						
All antimicrobials (Cumulative)	**924.6**	**679.0**	**0.0015***	931.0	774.6	0.051
Antipseudomonal antibacterials	248.3	199.5	0.0763	255.9	211.2	0.140
Anti-MRSA agents	73.04	74.14	0.9660	63.47	84.78	0.291
Fluoroquinolones	**90.17**	**49.4477**	**0.005***	**102.9**	**51.7**	**0.001***
Carbapenem	**55.52**	**29.80**	**0.023***	46.0873	51.5397	0.686
First generation Beta-lactam	**167.1**	**82.822**	**0.023***	129.1	162.4	0.443
Sulfamethoxazole/ Trimethoprim	29.58	27.844	0.876	34.2246	23.18	0.239
Piperacillin / Tazobactam	117.1	109.5	0.719	121.3	107.9	0.542

Table 3: Comparision of antimicrobial use in periods of: 1) Non-Active Audit and Feedback (AAF) versus Active AAF 2) Pre-Antimicrobial Stewardship Program (ASP) versus Post ASP Initiation, for patients admitted to the standard GIM ward (GIM-W) * = P < 0.05

Table 3	Comparison 1:			Comparison 2:		
GIM-W	Non-active ASP AAF	Active ASP AAF (excluding suspensions)	P Value	Pre ASP	Post ASP Initiation (including suspensions)	P value
DDD/1000 pt days						
All antimicrobials (Cumulative)	536.1	499.7	0.219	535.2	517.3	0.493
Antipseudomonal antibacterials	**97.2**	**74.15**	**0.003***	**103.0**	**78.20**	**0.004***
Anti-MRSA agents	36.6	31.6	0.394	**30.4**	**40.59**	**0.042***
Fluoroquinolones	**61.8**	**39.7**	**<0.001***	**70.4**	**40.35**	**<0.001***
Carbapenem	18.8	22.3	0.270	**15.3**	**24.6**	**<0.001***
First generation Beta-lactam	161.9	147.6	0.469	158.7	157.6	0.954
Sulfamethoxazole/ Trimethoprim	17.3	21.1	0.224	16.2	20.53	0.060
Piperacillin / Tazobactam	25.7	22.5	0.485	25.9	23.7	0.608

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