Disclosures. **Karri A. Bauer, PharmD**, **Merck & Co., Inc.** (Employee, Shareholder) **Levita K. Hidayat, PharmD BCIDP**, **Merck & Co., Inc.** (Employee, Shareholder) **Kenneth Klinker, PharmD**, **Merck & Co., Inc.** (Employee, Shareholder) **Mary Motyl, PhD**, **Merck & Co., Inc.** (Employee, Shareholder) **C. Andrew DeRyke, PharmD**, **Merck & Co., Inc.** (Employee, Shareholder)

128. Development of an Analytics Dashboard to Monitor Antimicrobial Selection and Duration for Pneumonia

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Carolina Antimicrobial Stewardship Program

Session: P-07. Antimicrobial Stewardship: Program Development and Implementation

Background. Analytical and visual tools can be used to monitor progress for a variety of ASP key performance indicators, but few data describe the process of building disease-state specific tools to retrospectively monitor antimicrobial choice and duration. We describe process and methods for development of a pneumonia dashboard.

Methods. In late 2019, the Carolina ASP began construction of a dashboard to monitor antimicrobial selection and duration in patients admitted with a diagnosis code (ICD-10) consistent with pneumonia. Data extracted from the medical record after discharge included: admission date and time, admission and discharge ICD-10s, inpatient orders and administrations for agents included in the NHSN Antimicrobial Use (AU) option, and antimicrobials ordered at discharge with associated ICD-10. Extracted data fields were validated using a one-month sample. Displays were constructed to trend selection during the first 48 hours of admission, inpatient days of therapy, and total length of therapy (sum of inpatient + outpatient days) for patients who received a discharge prescription for an antimicrobial included in the AU option that was associated with an ICD-10 consistent with pneumonia. Trends observed between Jan 2020 and Mar 2021 are reported.

Results. 341 admissions were trended. Within the first two days of admission, monthly proportions of patients receiving an antimicrobial by category were: anti-MRSA therapies (vancomycin, linezolid), 0.20 to 0.75; broad spectrum beta-lactams (e.g., cefepime, pip/tazo), 0.40 to 0.81; CAP therapies (e.g., ceftriaxone, levofloxacin), 0.48 to 1.00 (Figure). Median inpatient duration of therapy was 5 days (IQR 3-8; range 1 to 68). Total length of therapy was median 6 days (IQR 4-10; range 1 to 68).

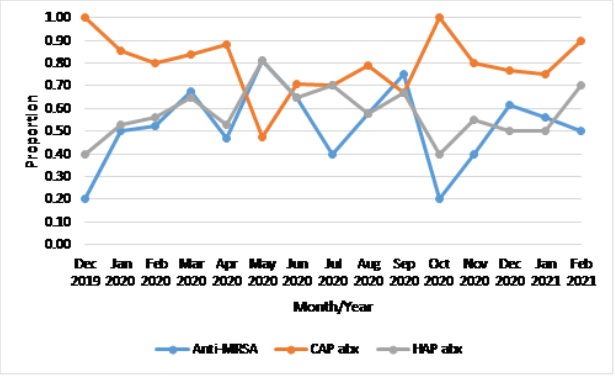

Figure. Proportions of Patients Prescribed Antimicrobial Categories of Interest During the First 48 Hours of Admissions for Pneumonia. Legend: Anti-MRSA = vancomycin or linezolid; HAP abx = cefepime, piperacillin/tazobactam, ceftazidime, meropenem; CAP = ceftriaxone, azithromycin, ampicillin/sulbactam, amoxicillin/clavulanate, cefdinir, levofloxacin.

Conclusion. Automated reports and visual tools can provide actionable insights for ASP practice. From this dashboard, we identified variable but high rates of anti-MRSA and broad-spectrum beta-lactam use within the first 48 hours of admission. The median inpatient and total length of therapy of 5 and 6 days, respectively, were similar to guideline-recommended durations. The up-front cost for building analytical tools can be substantial, but can be viewed as an investment if the metrics and methods are carefully selected.

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

129. Safety and Cost-effectiveness Analysis Outpatient Continuous Parenteral Antibiotics via a Disposable Elastomeric Pump at Two County Hospitals in Houston, Texas

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Session: P-07. Antimicrobial Stewardship: Program Development and Implementation

Background. Outpatient parenteral antibiotic therapy (OPAT) is a therapeutic option for patients who require longer intravenous (IV) antimicrobial courses, yet do not need to remain hospitalized. HarrisHealth system OPAT programs implement a disposable elastomeric continuous infusion pump (eCIP) for IV antibiotics. Here we report the clinic-demographic features, outcomes of a cohort of patients receiving OPAT via eCIP (OPAT-eCIP), as well as the cost-effectiveness of OPAT in comparison to standard inpatient care.

Methods. We retrospectively obtained the clinic-demographic characteristics and outcomes of 91 patients discharged from HarrisHealth-affiliated hospitals from December 2018 to February 2021 who underwent OPAT-eCIP. We then compared the total costs associated with home OPAT-eCIP care with that of an equivalent of inpatient IV antimicrobial treatment based on previous studies.

Results. We identified 481 total OPAT patients; 91 (18.9%) received intravenous antibiotics via eCIP, with two initiating therapy outpatient. In total, 1925 days of IV antimicrobial therapy were administered outpatient by OPAT-eCIP, with a median treatment course of 12 days. Eighty-three (92.2%) patients completed their antimicrobial course, with 85 (93.4%) cured of respective infections (Table 1). Antimicrobial-associated adverse events and PICC line associated complications were 6.6% and 14.3% respectively. 30-day hospital readmission rates were under 10% with 21 patients (23.1%, 28 total visits) presenting to the emergency room over the course of IV therapy. Estimated costs of OPAT-eCIP care over the study period ranged from $417,000-$576,750 with costs of equivalent inpatient care estimated at $2,945,250 to $3,927,000; estimated overall cost savings of OPAT-eCIP were $2,368,500 to $3,509,900 (Table 2).

Table 1. Characteristics and Outcomes of Patients Receiving Continuous IV Antibiotics via Disposable Elastomeric Pump

Variables	OPAT-eCIP (*n* = 91)
Characteristics	
Age (mean, years)	49
Male, n (%)	64 (70)
Category of Infection, *n* (%)	
Osteomyelitis or Septic Arthritis	26 (28.6)
Neurosyphilis or Ocular/Otosyphilis	27 (29.7)
Endocarditis or Endovascular infections	10 (11.0)
Skin or soft tissue infections	8 (8.8)
Intra-abdominal infections	6 (6.6)
Urinary tract infection	6 (6.6)
Other	8 (8.8)
Antimicrobial Therapy, *n* (%)	
Nafcillin	29 (31.9)
Penicillin G	31 (34.1)
Piperacillin/tazobactam	12 (13.2)
Cefazolin	15 (16.5)
Cefepime	4 (4.4)
Outcomes	
Completion of antimicrobial course, *n* (%)	83 (92.2)
Cure Rate, *n* (%)	
Yes	85 (93.4)
No	4 (4.4)
Unknown	2 (2.2)
Hospital readmission within 30 days, *n* (%)	9 (9.9)
Requiring Post-discharge emergency department (ED) visit within 30 days, *n* (%)	26 (28.6)
Requiring post-discharge ED visit, *n* (%)	21 (23.1)
PICC line complications, *n* (%)	13 (14.3)
Antibiotic-associated adverse effects, *n* (%) One case due to complications of IV therapy Nafcillin: acute kidney injury (1), leukopenia (1), peripheral edema (1), transaminitis (1) Piperacillin/Tazobactam: acute kidney injury (1) Cefazolin: transaminitis (1)	6 (6.6)

Table 2. Cost Analysis Comparison of OPAT-eCIP therapy versus inpatient antimicrobial therapy in patients from December 2018 from February 2021

Cost	OPAT	Inpatient antimicrobial therapy
Cost Per Inpatient Day ($)	0	1,500 - 2,000
Cost Per Antibiotic Dose ($)	20-30	30-40
OPAT staff cost ($)	150,000 - 200,000	0
Cost per ED visit ($)	750 - 850 (28 visits)	0
Cost per Home Health Visit ($)	10 0 - 200 (276 visits)	0
Estimated total cost ($)	417,100 - 576,750	2,945,250 - 3,927,000
Estimated cost savings ($)	2,368,500 - 3,509,900	

*Costs calculated using total days of continuous antibiotic infusion therapy (1,925 days) OPAT-eCIP (Outpatient parenteral antimicrobial therapy with disposable elastomeric continuous infusion pump), ED (Emergency department)

Conclusion. OPAT-eCIP therapy in a cohort of patients was highly effective and well-tolerated. While ED visit frequency indicates the necessity of close patient monitoring, low 30-day hospital readmission rates were encouraging. Along with the above, the significant cost savings demonstrated when compared with standard inpatient antimicrobial therapy suggest that OPAT-eCIP should be increasingly utilized as an effective therapeutic option.

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

130. Effects of COVID-19 on a Complex Behavioral Intervention to Improve the Diagnosis and Management of UTI in Nursing Homes

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Session: P-07. Antimicrobial Stewardship: Program Development and Implementation

Background. Half of all urinary tract infections (UTI) are probably unnecessary. We conducted a cluster-randomized trial in which a toolkit to enhance the diagnosis and treatment of UTIs was introduced in study NHs via usual implementation versus an enhanced implementation approach based on external facilitation and peer comparison reporting.

Methods. Thirty Wisconsin NHs were randomized to each treatment arm in a 1.5:1 ratio. NHs used an online portal to report urine culture and antibiotic treatment data over a 6-month pre-intervention period (Jan-June 2019), a pre-COVID 8-month post intervention period (July 2019-Feb 2020) and an 8-month post-COVID intervention period (Mar-Oct 2020). Study outcomes included urine culture (UC), antibiotic start (AS), and antibiotic days of therapy (DOT) rates per 1,000 resident days. A generalized estimating equation model for panel data was used to assess differences in study outcomes between treatment arms before and after onset of the COVID-19 pandemic. STATA 16.1 was used for all analyses.

Results. A total of 802 UCs (457 pre-COVID, 345 post-COVID), 724 AS (401 pre-COVID, 323 post-COVID), and 6,454 DOT (3553 pre-COVID and 2901 post-COVID) were reported over the 16-month intervention period. No significant differences in the study outcomes were observed during the pre-COVID intervention period, however, UC rates in NHs assigned to the usual care arm of the study increased while those in the enhanced arm declined following onset of COVID-19 (Figure 1). AS and DOT rates followed a similar pattern although the differences between the study arms were not statistically significant.

Figure 1. Post Implementation Periods

	Period 1 (before COVID-19)			Period 2 (after COVID-19)		
	Control (Mean)	Intervention (Mean)	*P*-value	Control (Mean)	Intervention (Mean)	*P*-value
Urine Cultures (per 1,000 rdays)	1.17	1.03	0.33	1.25	0.88	0.02
Antibiotic Starts (per 1,000 rdays)	0.97	0.93	0.75	1.12	0.86	0.08
Days of Therapy (per 1,000 rdays)	8.92	7.48	0.25	9.57	7.54	0.16

Conclusion. Our findings suggest that NHs assigned to usual implementation regressed in their diagnosis and treatment of UTIs during the COVID-19 pandemic while those receiving external facilitation and peer comparison reports were more resilient to the effects of COVID-19.

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

131. A Pharmacist Led Antimicrobial Stewardship Pilot at Discharge Improves Outpatient Antibiotic Utilization

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Session: P-07. Antimicrobial Stewardship: Program Development and Implementation

Background. The impact of antimicrobial stewardship programs has been well observed in institutional settings; however, patients complete over one-third of their antibiotic course after discharge. This creates a gap in stewardship efforts at transitions of care. We studied whether pharmacist review of antibiotic prescriptions at discharge would improve outpatient antibiotic prescribing.

Methods. This was a pilot project of patients in medicine wards of an academic medical center who were discharged on oral antibiotics between February and May 2021. Patients who were pregnant, <18 YO, had COVID-19, or leaving against medical advice were excluded from evaluation. For the pilot, a verification queue was created in the electronic health record (EHR) system where orders for discharge antibiotics were reviewed by investigator pharmacists before prescriptions were electronically sent to outpatient pharmacies. During the pilot, prescriptions were reviewed Monday-Friday afternoons from 12pm-4pm. Data was collected on incidence, type, and acceptance rate of pharmacist interventions, and a cost savings analysis was conducted with values calculated by the EHR system.

Results. There were 149 patients included with oral antibiotic prescriptions reviewed during the time frame. Of those patients, 48 (32.2%) had at least one prescription that was intervened on by a pharmacist. A total of 55 interventions were made with an acceptance rate of 76%. The median time for pharmacist review was 10 minutes (IQR 5-15). Patients who received infectious diseases (ID) consultation during admission required less intervention than patients without expert consultation but did not reach significance (8/35 and 47/114 respectively, p=0.07). The total cost savings associated with all interventions was $20,743.00.

Table 1. Interventions

Intervention type	N (%)
Duration	19 (35.4)
Incorrect dosing	16 (29.1)
• Underdosed	8
• Overdosed	7
• No directions	1
Antibiotic selection	9 (16.4)
• Organism resistant to prescribed antibiotic	3
○ *E. coli*	2
○ *S. aureus*	1
• Duplicate coverage	2
• Additional drug required	3
• Antibiotic streamlining	1
Lab required	4 (7.3)
No indication for antibiotics	4 (7.3)
Drug-drug interaction	3 (4.4)

Conclusion. Direct pharmacist review and intervention at discharge improved the prescribing of oral antibiotics within our institution during this pilot. Considering that this was conducted part-time in a subset of hospitalized patients during a limited time period, significant cost savings are possible with greater implementation.

Disclosures. **Jason C. Gallagher, PharmD, FIDP, FCCP, FIDSA, BCPS**, **Astellas** (Consultant, Speaker's Bureau)**Merck** (Consultant, Grant/Research Support, Speaker's Bureau)**Qpex** (Consultant)**scPharmaceuticals** (Consultant)**Shionogi** (Consultant) **Jason C. Gallagher, PharmD, FIDP, FCCP, FIDSA, BCPS**, Astellas (Individual(s) Involved: Self): Speakers' bureau; Merck (Individual(s) Involved: Self): Consultant, Grant/Research Support; Nabriva: Consultant; Qpex (Individual(s) Involved: Self): Consultant; Shionogi (Individual(s) Involved: Self): Consultant **Marissa Cavaretta, PharmD**, **Merck** (Grant/Research Support)

132. Standardized Antimicrobial Administration Ratios to Guide Antimicrobial Stewardship in the Neonatal Intensive Care Unit: a Single Center Experience

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Session: P-08. Antimicrobial Stewardship: Special Populations

Background. Antimicrobial stewardship (AMS) is particularly challenging in the neonatal population. Both under- and overuse can negatively impact outcomes. There are limited reports of strategies to improve AMS in the neonatal population. Standardized Antimicrobial Administration Ratios (SAARs) are novel metrics of antimicrobial use, recently introduced for neonatal populations by the National Healthcare Safety Network (NHSN). We describe our experience using SAARs to guide AMS in the neonatal intensive care unit (NICU).

Methods. This was a retrospective study conducted from January 2020 to April 2021. A team consisting of AMS and NICU department staff identified and implemented AMS strategies. Based on a review of NICU SAAR data, a goal was set to reduce third generation cephalosporin use by encouraging aminoglycoside use when appropriate. The pre-implementation period was January 2020 to May 2020 and the post-implementation period was July 2020 to April 2021. Antibiotic use was measured as SAARs and compared between study periods. The primary outcome was the neonatal SAAR for third generation cephalosporins. Secondary outcomes included SAARs