Conclusions. 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 outpatient antimicrobial therapy suggest that OPAT-eCIP should be increasingly utilized as an effective therapeutic option.

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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 1:1:1 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 on-set 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 |
| UTI Cultures (per 1,000 admrs) | 1.17 | 1.03 | 0.33 | 1.25 | 0.88 | 0.02 |
| Antibiotic Starts (per 1,000 admrs) | 0.97 | 0.93 | 0.75 | 1.12 | 0.86 | 0.08 |
| Days of Therapy (per 1,000 admrs) | 8.62 | 7.84 | 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 UTUs during the COVID-19 pandemic while those receiving external facilitation and peer comparison reports were more resilient to the effects of COVID-19.

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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. We conducted a project to significantly reduce outpatient antibiotic prescribing at discharge. We aimed to improve patient care by providing an early intervention to prevent outpatient antibiotic overuse.

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 (%) |
|-------------------|-------|
| Incorrect dosing   |       |
| Undosed           | 16 (29.1) |
| Overdosed         | 8     |
| No directions      | 7     |
| Antibiotic interaction | 1 |
| Organism resistant to prescribed antibiotic therapy (e.g., E. coli) | 9 (16.4) |
| 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.

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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-intervention 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...
for aminoglycosides and all neonatal antibacterial agents. SAARs were compared using the NHSN Statistics Calculator.

Results. For third generation cephalosporins, there were 385 observed antimicrobial days (OAD) and 115 expected antimicrobial days (EAD) in the pre-implementation period compared to 597 OAD and 228 EAD in the post implementation period. This resulted in a SAAR of 3.45 and 2.62, respectively for a reduction of 22% (p = 0.001).

For aminoglycosides, there were 713 OAD and 584 EAD compared to 1617 OAD and 1155 EAD. This resulted in a SAAR of 1.22 and 1.4; an increase of 15% (p = 0.002).

For neonatal antibacterial agents, there were 2714 OAD and 1730 EAD compared to 3321 OAD and 3438 EAD. This resulted in a SAAR of 1.56 and 1.55; indicating no change in use (p = 0.70). See Table 1 for results.

Table 1. Antibiotic Use

| Antibiotic Use | Pre-implementation | Post-implementation | Difference | p-value |
|---------------|--------------------|---------------------|------------|---------|
| Gentamicin    | 159                | 132                 | -27        | 0.001   |
| Tobramycin    | 39                 | 51                  | 12         | 0.001   |
| Cefazolin     | 100                | 100                 | 0          | 0.001   |
| Cefotaxime    | 100                | 100                 | 0          | 0.001   |
| Ceftriaxone   | 100                | 100                 | 0          | 0.001   |
| Ceftazidime   | 70                 | 66.6               | -3.4       | 0.001   |
| Ceftizime     | 85                 | 66.6               | -18.8      | 0.001   |
| Ceftolinidin-avibactam | 0   | 0                  | 0          | 0.001   |
| Ceftozolin    | 15                 | 33.3               | 18.3       | 0.001   |
| Ciprofloxacin | 95                 | 100                 | 5          | 0.001   |
| Levofloxacin  | 100                | 100                 | 0          | 0.001   |
| Orfivinavir   | 5                  | 33.3               | 28.3       | 0.001   |
| Dalvavirax    | 2.5                | 5                  | 2.5        | 0.001   |
| Daptomycin    | 65                 | 66.6               | 1.6        | 0.001   |
| Vancomycin    | 100                | 100                 | 0          | 0.001   |
| Aminocillin   | 100                | 100                 | 0          | 0.001   |
| Amoxicillin-clavulanate | 100 | 100                   | 0          | 0.001   |
| Ampicillin    | 85                 | 100                 | 15         | 0.001   |
| Difoxycine    | 100                | 100                 | 0          | 0.001   |
| Moxifloxacin  | 15                 | 0                  | -15        | 0.001   |
| Ciprofloxacin | 95                 | 100                 | 5          | 0.001   |
| Levofloxacin  | 100                | 100                 | 0          | 0.001   |

Conclusion. While this initiative resulted in decreased use of third generation cephalosporins, this was not associated with a decrease in antibiotic use overall. Use of SAARs in the NICU may be helpful in both identifying opportunities to improve antibiotic use and monitoring antibiotic use over time.

Disclosures: Steven Smoke, PharmD, Karius (Advisor or Review Panel member) Shionogi (Scientific Research Study Investigator, Advisor or Review Panel member)

133. A Review of Antimicrobial Formularies at Rural Hospitals: Stewardship Opportunities Abound

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Session: P-08. Antimicrobial Stewardship: Special Populations

Background. Management of a hospital’s antimicrobial formulary is an important aspect of antimicrobial stewardship and cost containment strategies. Ensuring that essential medications for clinical care are available and excluding therapeutic duplicates and unnecessary antimicrobials is time and resource intensive. Comparisons of antimicrobial formularies across multiple rural hospitals have not been evaluated in the literature. We hypothesized that a comprehensive formulary evaluation would reveal important opportunities for antimicrobial stewardship efforts and could help smaller hospitals optimize available medications.

Methods. The University of Washington Tele-Antimicrobial Stewardship Program (UW-TASP) is comprised of 68 hospitals of varying sizes, most of which are rural and critical access, in Washington, Oregon, Arizona, Idaho, and Utah. We surveyed UW-TASP participating hospitals and other networked rural hospitals in multiple Western states using REDCap, a HIPAA-compliant, electronic data management program. Respondents reported which antimicrobials are on their hospital formulary as well as basic information about hospital size and inpatient units. Data were reviewed by a panel of infectious diseases trained physicians and pharmacists at UW-TASP.

Results. Surveys from 49 hospitals were received; two were excluded from the data analysis (Table 1) - one submission was incomplete, and one was a large inpatient psychiatric hospital. Select antimicrobials and proportion of hospitals carrying these agents are shown in Table 2. Several antimicrobials are on the formulary at all hospitals, regardless of size. In some critical access hospitals (<25 beds), empiric first-line bac

Table 2. Formulary data

| Antibiotic Use | Number of hospitals in the study | OAD | EAD |
|---------------|--------------------------------|-----|-----|
| Amoxicillin   | 40                            | 5   | 0   |
| Gentamicin    | 3                               | 95  | 100 |
| Tobramycin    | 9                              | 100 | 100 |
| Cefazolin     | 34                             | 100 | 100 |
| Cefotaxime    | 1                              | 100 | 100 |
| Ceftazidime   | 34                             | 100 | 100 |
| Metronidazole | 8                              | 100 | 100 |

Table 3. Hospitals lacking encephalitis/meningitis coverage

| Critical Drugs Missing from Formulary | Number of hospitals (N =47) |
|--------------------------------------|----------------------------|
| IV Amoxicillin                       | 6 (12.7)                   |
| Alternative available (meropenem)    | 1 (2.1)                    |
| IV Acyclovir                         | 7 (14.9)                   |
| Alternative available (valacyclovir) | 3 (6.4)                    |

Conclusion. In critical access hospitals in the Western USA, lack of essential empirical antimicrobials may be more of a concern than inclusion of agents with unnecessarily broad spectra.

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134. Impact of an Antibiotic Stewardship Treatment and Management Algorithm for Liver Abscesses

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Session: P-08. Antimicrobial Stewardship: Special Populations

Background. Antibiotic prescribing for pyogenic liver abscess(es) (PLA) is highly variable with literature primarily aimed at assessing surgical intervention with a scarcity of data for antibiotic selection and duration of therapy. Given the lack of data, there is no clear consensus for treatment options or length of treatment. Our Antimicrobial Support Network (ASN) in collaboration with the hepatopancreatology (HPF) team created a treatment and management algorithm to guide duration of therapy and antibiotic selection.