99. Presence of Chronic Diseases and Compliance with Quebec Provincial Guidelines for Outpatient Antibiotic Prescription, Quebec, Canada, 2010-2017

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Session: P-06. Antimicrobial Stewardship: Non-Inpatient Settings

Background. In Quebec primary care, antimicrobial use is higher in patients with chronic diseases, but it is unclear whether this utilization may be reduced. We aimed to measure the proportion of compliant antimicrobial prescriptions according to the provincial guidelines for the treatment of common respiratory and urinary infections and measure variations in this proportion with certain chronic diseases.

Methods. Antimicrobial dispensing covered by the public drug insurance plan between April 2010 and March 2017, delivered within 2 days of an outpatient consultation for an infection was included. Infections targeted by provincial guidelines were studied: otitis media, pharyngitis, pneumonia, sinusitis, bronchitis and chronic obstructive pulmonary disease exacerbations, cystitis, and acute pyelonephritis. The proportion of prescriptions compliant with guidelines (right antimicrobial for children, and right antimicrobial and dosage for adults) was computed by age group (children or adults) and per category of chronic disease (respiratory, cardiovascular, diabetes, mental disorder, none of previous). For each infection and age group, multivariate robust Poisson regression was used to measure the impact of categories of chronic diseases on proportions of prescriptions compliant with guidelines.

Results. Between 14 677 and 312 786 prescriptions were included, for each infection. Compliance to guidelines was above 87% in children and was significantly lower (≤ 3% bellow) in children with asthma. In adults, the choice of agent was compliant for at least 73% of prescriptions, except for cases of pharyngitis (between 53% and 61%). Accounting for dosage led to lower proportions of compliance, which varied between 19% (cystitis with diabetes) and 77% (pyelonephritis with none of the studied chronic disease categories). Compliant prescriptions were 2.4% to 20.4% less frequent in the presence of chronic diseases (statistically significant).

Conclusion. Non-compliant prescriptions could still be appropriate, but their high frequency suggests there is room for improvement. Dosage seems particularly problematic. Additional support could be offered to clinicians for the prescription of antimicrobials to patients with chronic diseases.

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100. Assessment of Emergency Department Prescribing Practices for Outpatient Treatment of Urinary Tract Infection, Community-Acquired Pneumonia, and Skin and Soft Tissue Infections

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Session: P-08. Antimicrobial Stewardship: Non-Inpatient Settings

Background. Studies have found a need for improved antimicrobial stewardship in the outpatient setting. This setting is limited by high populations and daily discharges, studied as many focus on viral infections. This study focuses on the adult emergency departments (EDs) in a large healthcare system and quantifies the proportion of anti-biotic prescriptions deemed inappropriate for common outpatient infections.

Methods. A retrospective study was conducted in patients with selected common infections treated as an outpatient from the ED. Patients were reviewed for eligibility based on the inclusion and exclusion criteria in Table 1. Appropriateness was based on need for antimicrobial therapy; agent choice, dose, duration, and directions in concordance with national guidelines and local resistance patterns; and no clinically relevant drug interactions, unnecessary dual coverage, or a better or safer alternative available. The entire prescription was marked inappropriate if any factor was deemed inappropriate.

Table 1. Inclusion and Exclusion Criteria

| Inclusion Criteria | Exclusion Criteria |
|--------------------|-------------------|
| • Age ≥18 years and <90 years | • Time in ED ≥24 hours |
| • ICD-10 codes for urinary tract infections, community-acquired pneumonia, or skin/soft tissue infection (N29, J13-22, L08) | • Inpatient admission |
| • Treated at one of five included emergency departments between October 1, 2018 and February 29, 2020, inclusive | • ID consultation |

Based on the Epic report generated, a random sample of patients were selected for manual review. Only patients who met the following criteria were eligible for inclusion in the final analysis.

Results. Of the 318 patients reviewed, 274 were included. Treatment was deemed inappropriate 64% (174/274) of the time, significantly above the estimated 30% (p < 0.001). The agent selection, duration, and dose were the most the frequent factors deeming a prescription inappropriate. The most inappropriately used agents were fluoroquinolones and azithromycin. A positive culture required modification of therapy 31% (32/102) of the time and most often the drug was guideline recommended. For example, when empiric antibiotic selection was per urinary tract infection guidelines, 31% (14/45) required modification compared to 19% (3/16) when the agent was not. This was most apparent when cephalexin was used.

Conclusion. The use of antibiotics at the studied EDs was not in concordance with guidelines in the study period. However, the cultures were sensitive less often to agents deemed appropriate per guidelines for empiric therapy. It is possible that the ideal treatments of antibiotic infections in this community are not representative of national resistance patterns. Using ED-specific antibiograms to create order panels for common infections, as well as prospective pharmacist review at ED discharge, could increase appropriate utilization of preferred agents.

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101. Impact of an Integrated Tele-Antimicrobial Stewardship Program at a Rural Community Hospital

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

Background. In small hospitals in the US may lack access to infectious diseases (ID) expertise despite similar rates of antimicrobial use and drug-resistant bacteria as larger hospitals. A tele-antimicrobial stewardship program (TASP) is a force multiplier, expanding access to specialty care, training, and guidance on appropriate resource utilization. Data on the impact of TASP in community or rural inpatient settings is limited.

Methods. We established a TASP at a 160-bed hospital in Armstrong County, PA (population < 5000) in September 2020. Tele-1D consult services were already being used (Figure 1). A non-local ID pharmacist or ID physician performed prospective audits and provided feedback with 1 local pharmacist on a 30-minute video conference call daily. At TASP implementation, all patients receiving intravenous (IV) fluoroquinolones, metronidazole, and azithromycin were reviewed. Figure 1 shows the additional support following TASP implementation, including addition of ceftriaxone, carbapenem, IV vancomycin, and tocolzumab to daily reviews. A patient monitoring form was developed to track interventions and the local pharmacists were trained in documentation. Table 1 lists other TASP features implemented.

Table 1. TASP Timelines

| Figure 1. TASP Timeline |
|-------------------------|-------------------------|
| Pre-TASP                 | Post-TASP               |
| Infection Management    | Infection Management    |
| Outreach                 | Outreach                 |
| Discharge                | Discharge                |
| TASP                     | TASP                     |
| Pharmacy rounds          | Pharmacy rounds          |
| TASP rounds              | TASP rounds              |

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Table 1. TASP Accomplishments

| Patient Care          | Guidelines                      | Microbiology Lab | Policies       | Education                   |
|-----------------------|---------------------------------|------------------|---------------|-----------------------------|
| Prospective audit     | Empiric Antimicrobials for       | Updated local    | MICROD and    | Introduction to              |
| with feedback M/P     | Common Infections               | antibiotic       | Isolation     | Stewardship webinar         |
|                       |                                 |                  |               |                             |
| Patient monitoring    | COVID-19                        | Revised cascade  | Surgical       |                             |
| form                  | reporting reports               | reporting rules  | prophylaxis    |                             |
|                       |                                 |                  |               |                             |
| Stewardship intervention form | CAP                      | Updated AST panels and reporting rules to align with current breakpoints | Aminoglycoside dosing | Tocilizumab webinar |

Available for patient-related questions via email outside of daily stewardship call

HAP/VAP
Added clinician comments to culture and laboratory test results
Renal dosing
Monthly stewardship pearl newsletter

Coaching on conducting thorough beta-lactam allergy history

Procalcitonin
Revised antibiotic reporting rules for enterococcus spp. isolated in urine cultures
Indications for use on electronic antibiotic orders

IV to PO conversion
Enhanced culture results display to providers in electronic health record for improved readability
Vancomycin dosing in dialysis

Results. From 09/01/2020 to 04/30/2021, 304 stewardship opportunities were identified and 77% of interventions were accepted. Recommending a duration of therapy was accepted most frequently (93.5%) and de-escalation of therapy least frequently (69.6%) (Table 2). Recommending an ID consultation or diagnostic testing was always accepted but only comprised 6.2% of all interventions. Daily calls involved an average of 5 patient reviews. Monthly antimicrobial use declined on average from 673 DOT (days of therapy)/1000 PD (patient days) to 638 DOT/1000 PD (Figure 2). Daily calls were cancelled on 31/166 weekdays (18.7%) due to staffing shortages.

Table 2. TASP Interventions (9/2020 - 4/2021)

|         | 9/2020 | 10/2020 | 11/2020 | 12/2020 | 1/2021 | 2/2021 | 3/2021 | 4/2021 | Total |
|---------|--------|---------|---------|---------|--------|--------|--------|--------|-------|
| Discontinue | 3/4    | 2/4     | 6/13    | 6/6     | 8/11   | 10/13  | 13/16  | 8/11   | 304/80 (70%) |
| De-escalate | 3/4    | 3/3     | 6/6     | 10/15   | 8/11   | 6/11   | 12/18  | 7/13   | 55/79 (89.6%) |
| IV to PO conversion | 10/14 | 10/11   | 4/6     | 2/4     | 1/1    | 0/0    | 6/8    | 5/6    | 38/50 (76%) |
| Duration | 2/2    | 4/4     | 5/5     | 5/5     | 3/5    | 2/2    | 11/13  | 11/13  | 43/46 (93.5%) |
| Dosing  | 2/4    | 0/0     | 1/1     | 0/0     | 3/3    | 0/0    | 4/4    | 4/4    | 14/26 (67.5%) |
| ID Consult | 1/1    | 0/0     | 1/1     | 2/2     | 0/0    | 0/0    | 8/8    | 0/0    | 12/12 (100%) |
| Escalate | 0/0    | 1/1     | 1/1     | 0/0     | 0/0    | 0/0    | 3/2    | 3/2    | 6/9 (66.7%) |
| Diagnostics | 1/1    | 0/0     | 0/0     | 0/0     | 1/2    | 0/0    | 2/2    | 3/2    | 5/10 (100%) |
| Other   | 2/2    | 0/0     | 0/0     | 0/1     | 0/0    | 0/0    | 0/1    | 1/1    | 3/5 (60%) |

Conclusion. Implementation of TASP in a community hospital resulted in a high percentage of accepted stewardship interventions and lower antimicrobial usage. Success is dependent on robust educational efforts, establishing strong relationships with local providers, and involvement of key stakeholders. Lack of dedicated stewardship time for local pharmacists is a very significant barrier.

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102. Evaluation of the Association between the Antibiotic Spectrum Index and Antibiotic Days of Therapy: A Retrospective Study across 124 Acute-care Hospitals

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

Background. Antibiotic stewardship programs often measure antibiotic days of therapy (DOT), but this metric does not reflect the antibiotic spectrum. In this study, we used the previously published Antibiotic Spectrum Index (ASI), which attaches a score (1-13) to the spectrum of each antibiotic, to evaluate the content of antibiotic use across all Veterans Health Administration (VHA) hospitals. We also assessed how benchmarking hospital performance changed when ASI was used instead of DOT.

Methods. We conducted a retrospective cohort study of patients admitted to 124 acute-care VHA hospitals during 2018. We obtained data on administered antibiotics, the days of antibiotic use (DOT), and days-present (DP) from the VHA Corporate Data Warehouse and then aggregated data to the hospital-level using the National Healthcare Safety Network’s methodology. We modified the original ASI by changing 3.8% of the bug-drug scores to ensure consistency across all scores and adding 27 new antibiotics agents. For each hospital, we calculated ASI/DOT, ASI/1,000 DP, and DOT/1,000 DP and ranked hospitals on their performance. We performed a