# Prescription Patterns among Outpatients with Antibiotic Failure/Intolerance in the Treatment of Acute Bacterial Skin and Skin Structure Infections (ABSSSI): A 2020 to 2022 Retrospective Cohort Study

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## ABSTRACT

**Objectives**

Recurrent ABSSSI is diagnosed in 16% to 53% of all ABSSSI cases. Study aim was to describe antibiotic prescription patterns among outpatients diagnosed with ABSSSI who experienced antibiotic failure/intolerance.

**Methods**

Study was a retrospective (2020–2022) electronic health record-based study of outpatients (age ≥18), who received care within Hartford Healthcare outpatient clinics including wound clinics across Connecticut. Patients had ICD-10 codes for ABSSSI, and were identified as experiencing antibiotic failure/intolerance defined as receipt of both an initial antibiotic prescription and a subsequent oral antibiotic within 90 days of initial visit with 1 in 4 patients undergoing manual chart review for etiology confirmation. Appropriateness of antibiotic therapy i.e., receipt of MRSA-coverage (tetracycline class, sulfamethoxazole-trimethoprim (TMP-SMX), clindamycin) for abscess-related infections was assessed in concordance with IDSA and antibiotic stewardship guidance.

**Results**

A total of 390 patients were included with initial and subsequent antibiotic prescriptions. Mean age was 63.3 years, and 55.9% were female. Majority of patients had commercial insurance (61.5%) compared to Medicaid/Medicare (37.4%). Patients presented with cellulitis (74.1%) and abscess (20.3%) at index visit.

The most commonly prescribed antibiotics by pharmacy class were β-lactam (47.2%), tetracycline (24.6%) and sulfonamide-combination (21.3%) at index visit. The proportion of index and subsequent prescriptions for the most commonly prescribed antibiotic medications were: cephalexin (34.4 vs 28.2%), doxycycline (23.8 vs 27.7%), TMP-SMX (21.3 vs 22.6%), and amoxicillin-clavulanate (6.9 vs 6.2%). A decrease in β-lactam prescriptions, primarily driven by fewer cephalexin orders, and concurrent increase in antibiotics with MRSA coverage was observed between initial and subsequent prescriptions. Antibiotic appropriateness among patients with abscess (64.6 vs 64.8%) was similar with index and subsequent antibiotic.

**Conclusions**

There was an escalation from β-lactam oral antibiotics to MRSA-active antibiotics in patients experiencing antibiotic failure/intolerance. Further research is needed to understand patient comorbidities that predict failure and the financial burden of treatment failure/intolerance among outpatients with ABSSSI. In addition, these data will be instrumental in our current efforts to initiate an outpatient stewardship program and deploy interventions to improve care across the healthcare continuum.

## INTRODUCTION

- Incidence of acute bacterial skin and skin structure infections (ABSSSI) have increased and pose a burden on the health care system[1,2]
- Acute bacterial skin infections result in approximately 14 million ambulatory care visits, 320,000 additional hospitalizations/year and is a leading cause for antibiotic use in hospitals[1,2]
- Recurrent infections have been reported to occur in nearly half of patients with skin infections[3]
- Unfortunately, antibiotic stewardship efforts are lacking in the outpatient setting
  - A cross-sectional, multicenter survey describing the current state of ambulatory stewardship program showed that only 7% (7 out of 129 Vizient member hospitals) had a fully functioning program[4]

## OBJECTIVES

- To describe antibiotic prescription patterns among outpatients diagnosed with ABSSSI who experienced antibiotic failure or intolerance
- To elucidate causes/reasons for treatment failure or intolerance

## METHODS

- This was an IRB-approved single center, retrospective study (2020-2022) that included patients presenting to outpatient clinics (n=120 clinics) within a large healthcare system in Connecticut

**Inclusion criteria:**

- Adults (≥ 18 years) with ICD-10 diagnosis code for ABSSSI: A46, A49.0, A49.01, A49.02, A49.1, B95.0, B95.2, B95.4, B95.5, B95.61, B95.62, B95.8, J34.0, L03.211, L03.221, L03.90, L97.80, N61.1, H60., H61.0, L08., L03.
- Did not have an encounter 30 days prior to index visit (wash-out period)
- Receipt of an initial antibiotic prescription within 3 days of index visit (1st medication order (MO)) and an additional oral antibiotic prescription (2nd MO) within 90 days

**Analysis:**

- Type of infection, antibiotic utilization (by drug and class) were extracted and analyzed by chi-square ($\chi^2$)
- Chart review of randomly selected patients to identify reason for apparent failure or intolerance. Data presented with descriptive analysis
- SigmaPlot version 14, p≤0.05 considered statistically significant

## RESULTS

**Table 1. Patient (n=390) demographics**

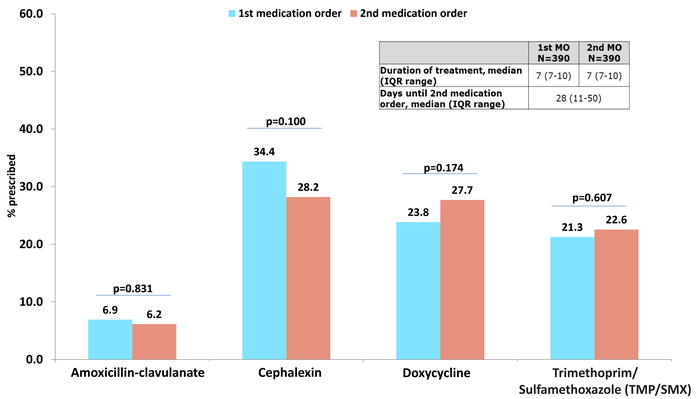
| Demographics | N = 390 | |
|---|---|---|
| **Age, years** | | |
| Mean (SD) | 63 (18) | |
| **Sex, n (%)** | | |
| Female | 218 | 55.9% |
| Male | 172 | 44.1% |
| **Race, n (%)** | | |
| American Indian or Alaska Native | 2 | 0.5% |
| Asian | 2 | 0.5% |
| Black or African American | 25 | 6.4% |
| Other | 33 | 8.5% |
| Unknown | 14 | 3.6% |
| White or Caucasian | 314 | 80.5% |

**Table 2. ABSSSI characteristics across outpatient encounters**

| Type of Infection, n (%) | 1st MO | 2nd MO | P-value |
|---|---|---|---|
| Abscess | 79 (20.3%) | 71 (18.2%) | |
| Cellulitis | 289 (74.1%) | 296 (75.9%) | 0.766 |
| Other | 22 (5.6%) | 23 (5.9%) | |
| **Most common ICD-10 codes, n (%)** | | | |
| L03.116 Cellulitis of left lower extremity | 52 (13.3%) | | |
| L03.115 Cellulitis of right lower extremity | 45 (11.5%) | | |
| L02.91 Cutaneous abscess, unspecified | 22 (5.6%) | | |
| L03.119 Cellulitis of lower extremity, unspecified laterality | 21 (5.4%) | | |
| L03.90 Cellulitis, unspecified cellulitis site | 15 (3.8%) | | |
| L03.114 Cellulitis of left upper extremity | 10 (2.6%) | | |

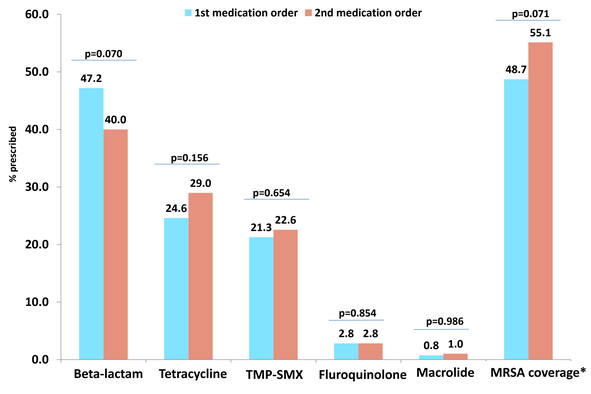
## RESULTS

**Figure 1. Percent frequency of most prescribed antibiotics as a first medication order versus second medication order**



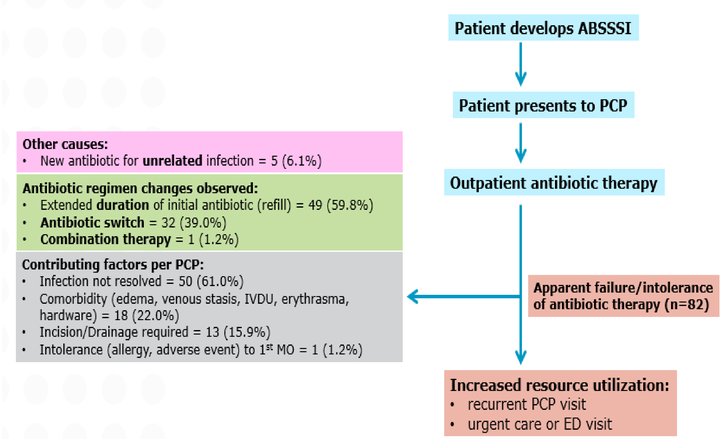

| | 1st MO N=390 | 2nd MO N=390 |
|---|---|---|
| Duration of treatment, median (IQR range) | 7 (7-10) | 7 (7-10) |
| Days until 2nd medication order, median (IQR range) | 28 (11-50) | |

**Figure 2. Percent frequency of antibiotic class prescribed as a first medication order versus second medication order**




*Doxycycline, clindamycin, TMP-SMX, minocycline

**Figure 3. Chart review (n=87 patients) to identify reasons for the lack of response to therapy**




## DISCUSSION & CONCLUSION

- Cephalexin, doxycycline, sulfamethoxazole-trimethoprim, and amoxicillin/clavulanate were the 4 most frequently prescribed antibiotics
- Median (IQR) duration between first and second antibiotic prescription was 28 days (11-50 days)
- There was a decrease in β-lactam prescriptions and concurrent increase in antibiotics with MRSA coverage between initial and second prescriptions
- Chart review revealed 60% of patients required refills due to lack of disease resolution
- Further research is needed to identify risk factors for patient failure/intolerance or patients that require empiric MRSA coverage.

## REFERENCES

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