Incidence of Emergency Department Visits and Hospitalizations After Outpatient Treatment With an Oral Antibiotic Among Patients With Acute Bacterial Skin and Skin Structure Infections

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Abstract 654

Kenneth LaPensee, PhD, MPH[1]; Hoa Van Le, MD, PhD[2]; Thomas Lodise, PhD, PharmD[3]

[1]Paratek Pharmaceuticals, Inc., King of Prussia, PA, USA; [2]Parexel International Corp., Durham, NC, USA; [3]Albany College of Pharmacy and Health Sciences, Albany, NY, USA

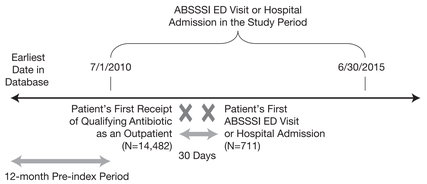
BACKGROUND

- Acute bacterial skin and skin structure infection (ABSSSI) places a substantial burden on the healthcare system
- While most patients with ABSSSI present to the emergency department (ED), over 20% of patients in the USA are initially treated in outpatient settings[1,2]
- Common reasons for ED visits or hospitalization for ABSSSI are treatment failure (progression of the infection despite treatment) and recurrence of the original infection following apparently successful treatment[3,4]
- This study assessed the frequency of ED visits/hospitalization among patients with ABSSSI who initially received one of the most commonly used oral antibiotics for ABSSSI in outpatient settings
- The study aimed to determine the proportion of patients treated in the community with oral antibiotics of interest who presented to the ED/were admitted to hospital within 30 days. The data were analyzed by admission type and type of antibiotic

METHODS

- This was a retrospective cohort study of patients with ABSSSI treated within the Geisinger Health System who were initially treated as outpatients between 2010 and 2015
- This analysis is a period prevalence study in which the index is the day of first receipt of a qualifying outpatient antibiotic
- Inclusion criteria:
  - Age ≥18 years
  - International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code in outpatient settings for ABSSSI diagnosis (**Table 1**)
  - ≥1 year enrollment in health system before index ABSSSI
  - Receipt of trimethoprim/sulfamethoxazole (TMP-SMX), clindamycin (CLI), cephalexin (CEP), ciprofloxacin, levofloxacin, azithromycin or amoxicillin/clavulanate as an outpatient
- TMP-SMX, CLI and CEP were the focus of this analysis as these agents are commonly recommended for ABSSSI treatment in outpatient settings[5]
- Patients with a diagnosis of osteomyelitis, septic arthritis, necrotizing fasciitis, infected decubitus ulcer, or severe sepsis/septic shock were excluded
- The outcome measured was presence/absence of ED visit or hospitalization for ABSSSI within 30 days after initial outpatient oral antibiotic treatment

Figure 1. Study Design and Patient Flow



ABSSSI = acute bacterial skin and skin structure infection; ED = emergency department

METHODS

Table 1. ABSSSI ICD-9 Codes Included in the Analysis

ICD-9-CM	Code Description
681XX	**Cellulitis and abscess of finger and toe**
681	Cellulitis and abscess of finger, unspecified
68101	Felon
68102	Onychia and paronychia of finger
6811	Cellulitis and abscess of toe, unspecified
68111	Onychia and paronychia of toe
6819	Cellulitis and abscess of unspecified digit
682XX	**Other cellulitis and abscess**
682	Cellulitis and abscess of face
6821	Cellulitis and abscess of neck
6822	Cellulitis and abscess of trunk
6823	Cellulitis and abscess of upper arm and forearm
6824	Cellulitis and abscess of hand, except fingers and thumb
6825	Cellulitis and abscess of buttock
6826	Cellulitis and abscess of leg, except foot
6827	Cellulitis and abscess of foot, except toes
6828	Cellulitis and abscess of other specified sites
6829	Cellulitis and abscess of unspecified sites
686XX	**Other local infections of skin and subcutaneous tissue**
6868	Other specified local infections of skin and subcutaneous tissue
6869	Unspecified local infection of skin and subcutaneous tissue
9583X	**Post-traumatic wound infection, not elsewhere classified**
9583	Post-traumatic wound infection, not elsewhere classified
9985X	**Post-operative wound infection**
99851	Infected post-operative seroma
99859	Other post-operative infection
035XX	**Erysipelas**
035	Erysipelas
56731	Psoas muscle abscess
67510	Abscess of breast associated with childbirth, unspecified as to episode of care or not applicable
67511	Abscess of breast associated with childbirth, delivered, with or without mention of ante-partum condition
67512	Abscess of breast associated with childbirth, delivered, with mention of post-partum complication
67513	Abscess of breast associated with childbirth, ante-partum condition or complication
67514	Abscess of breast associated with childbirth, post-partum condition or complication
67520	Non-purulent mastitis associated with childbirth, unspecified as to episode of care or not applicable
67523	Non-purulent mastitis associated with childbirth, ante-partum condition or complication

ICD-9-CM = International Classification of Diseases, Ninth Revision, Clinical Modification

Data Source

- Geisinger is an integrated health system with a 1,500+ member multi-specialty physician group practice, 12 hospital campuses, 83 primary and specialty clinic sites, two research centers, a 580,000-member health plan, and millions of patients
- Geisinger offers de-identified, electronic medical record-based data extracts that provide a comprehensive view of patients' medical histories. Representing both inpatient and outpatient settings, from primary to specialty care, the data includes: lab results, vital signs, medications, procedures, diagnoses, lifestyle data, and detailed costs, all of which are routinely captured by Geisinger at the point of care
- Within the database, episodes of care contain information on patient encounters grouped by an outpatient visit or inpatient stay with all of the associated current procedural terminology codes and ICD-9-CM diagnosis codes. Within each episode, ICD-9-CM procedure codes and standardized cost IDs provide daily detail on procedures, medications, services, supplies and equipment received each day in the course of providing patient care

RESULTS

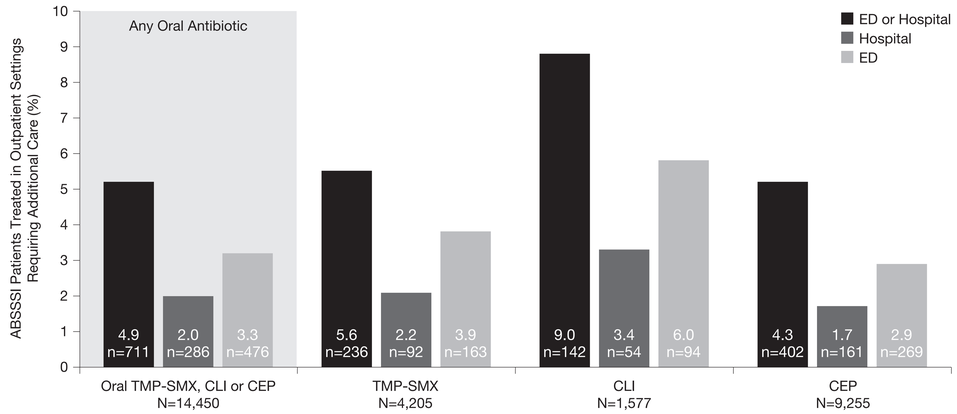
- During the study, 14,450 patients had an ABSSSI and received TMP-SMX, CLI or CEP in the outpatient setting
- Among these individuals, 711 (4.9%) patients received additional care in the ED (476 patients) and/or were hospitalized (286 patients) within 30 days of outpatient oral antibiotic treatment (**Table 2**)
- **Fig. 2** shows the proportions of patients with ABSSSI treated with each of the oral antibiotics in the outpatient setting who received additional care in the ED/hospital within 30 days

Table 2. Proportion of Patients Who Received Oral Antibiotics of Interest in the Community Who Were Treated in the ED or Had a Hospital Admission for ABSSSI Within 30 Days of Initial Outpatient Treatment

	Admission or ED					Admission				ED Visit			
	Total	NO		YES		NO		YES		NO		YES	
	N	n	Row %	n	Row %	n	Row %	n	Row %	n	Row %	n	Row %
Overall	29,722	28,221	95.2	1,501	5.1	29,031	97.7	691	2.3	28,808	96.9	914	3.1
Oral TMP-SMX, Clindamycin, or Cephalexin	14,450	13,739	95.3	711	4.9	14,164	98.0	286	2.0	13,974	96.7	476	3.3
Oral Ciprofloxacin, Levofloxacin, Amoxicillin/Clavulanate, or Azithromycin	3,757	3,511	93.9	246	6.5	3,641	96.9	116	3.1	3,605	96.0	152	4.0
TMP-SMX	4,205	3,969	94.7	236	5.6	4,113	97.8	92	2.2	4,042	96.1	163	3.9
Clindamycin	1,577	1,435	91.7	142	9.0	1,523	96.6	54	3.4	1,483	94.0	94	6.0
Cephalexin	9,255	8,853	95.8	402	4.3	9,094	98.3	161	1.7	8,986	97.1	269	2.9
Ciprofloxacin	647	586	91.4	61	9.4	615	95.1	32	4.9	612	94.6	35	5.4
Levofloxacin	323	287	90.0	36	11.1	301	93.2	22	6.8	307	95.0	16	5.0
Azithromycin	387	369	95.6	18	4.7	382	98.7	5	1.3	374	96.6	13	3.4
Amoxicillin/Clavulanate	2,485	2,346	94.7	139	5.6	2,426	97.6	59	2.4	2,390	96.2	95	3.8

ABSSSI = acute bacterial skin and skin structure infection; ED = emergency department; TMP-SMX = trimethoprim/sulfamethoxazole

Figure 2. Proportion of Patients Who Received Additional ED or Hospital Care Within 30 Days of Outpatient ABSSSI Treatment



ABSSSI = acute bacterial skin and skin structure infection; CEP = cephalexin; CLI = clindamycin; ED = emergency department; TMP-SMA, trimethoprim/sulfamethoxazole

CONCLUSIONS

- Overall, one in 20 patients who received trimethoprim/sulfamethoxazole, clindamycin, or cephalexin as an outpatient for ABSSSI subsequently received care within 30 days in the ED or hospital
- The observed incidence of subsequent ED visits/hospitalization was highest with prior outpatient clindamycin treatment (9.0%)
- Additional analyses are needed to determine which patients with ABSSSI are at greatest risk for ED visits/hospitalizations after initial treatment in the outpatient setting with trimethoprim/sulfamethoxazole, clindamycin or cephalexin, and if alternative oral antibiotics can reduce subsequent ED visit/hospitalization rates

Next steps

- Confirm the results of this study in a nationally representative claims database
- If possible, analyze microbiological test results in this database to determine whether patients presented to the hospital with resistant pathogens after failing antibiotic treatment prescribed in the community
- Identify factors associated with antibiotic failure and recommend changes in antibiotic prescribing practice as appropriate

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