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Demographic and Treatment Patterns for Infections in Ambulatory Settings in the United States, 2006-2010

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Abstract

Objectives—Many factors may influence choice of care setting for treatment of acute infections. The authors evaluated a national sample of U.S. outpatient clinic and emergency department (ED) visits for three common infections (urinary tract infection [UTI], skin and soft tissue infection [SSTI], and upper respiratory infection [URI]), comparing setting, demographics, and care.

Methods—This was a retrospective analysis of 2006–2010 data from the National Hospital Ambulatory Care Survey (NHAMCS) and National Ambulatory Care Survey (NAMCS). Patients age ≥ 18 years with primary diagnoses of UTI, URI, and SSTI were the visits of interest. Demographics, tests, and prescriptions were compared, divided by ED versus outpatient setting using bivariate statistics.

Results—Between 2006 and 2010, there were an estimated 40.9 million ambulatory visits for UTI, 168.3 million visits for URI, and 34.8 million visits for SSTI; 24% of UTI, 11% of URI, and 33% of SSTI visits were seen in EDs. Across all groups, ED patients were more commonly younger and black and had Medicaid or no insurance. ED patients had more blood tests (54% vs. 22% for UTI, 21% vs. 14% for URI, and 25% vs. 20% for SSTI) and imaging studies (31% vs. 9% for UTI, 27% vs. 8% for URI, and 16% vs. 5% for SSTI). Pain medications were more frequently used in the ED; over one-fifth of UTI and SSTI visits included narcotics. In both settings, greater than 50% of URI visits received antibiotics; more than 40% of UTI ED visits included broad-spectrum fluoroquinolones.

Conclusions—Emergency departments treated a considerable proportion of U.S. ambulatory infections from 2006 to 2010. Patient factors, including the presence of acute pain and access to care, appear to influence choice of care setting. Observed antibiotic use in both settings suggests a need for optimizing antibiotic use.

Acute infection is a common reason for seeking care in ambulatory settings, including hospital-based emergency department (ED) and outpatient clinics. Care for acute infection typically consists of provider evaluation, laboratory or imaging to rule in or rule out other diseases, and procedures or medications aimed at treating the infection and controlling symptoms. Acute ambulatory infections can be treated in a variety of settings including

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Supporting Information:
The following supporting information is available in the online version of this paper: **Data Supplement S1.** Medications and medication codes included in the analysis. The document is in DOCX format.

outpatient clinics, EDs, urgent care centers, and retail clinics or by phone-based consultation in some cases.

The choice of where to seek care depends on various factors, including the severity of symptoms, access, timeliness, perceived quality, and available services in specific settings.[1] Other factors can also play into the decision, such as advice by primary care physicians to seek care in the ED, high self-perceived illness severity, and convenience, all of which can lead to use of the ED for low-acuity complaints, including acute infections.[2–4] Across all diagnoses, EDs designated as safety-net hospitals treat a greater proportion of low-acuity cases,[5] with non-Hispanic black patients, older adults, patients with lower socioeconomic status, and those with Medicaid coverage being more likely to seek ED care.[6,7] While outpatient clinics and EDs see similar types of infection treated in the ambulatory setting, there may be important differences in management of these patients, with implications for patient outcomes, quality, and costs. While previous studies have described the demographic characteristics of ED patients, to our knowledge this study is the first to comprehensively compare the patient characteristics and care and management of patients with uncomplicated infections treated in both settings.

We explored demographics and care delivered for three common outpatient infections in adults with urinary tract infections (UTIs), upper respiratory infections (URIs), and skin and soft tissue infections (SSTIs), comparing EDs to outpatient clinic settings in the United States using nationally representative data over a 5-year period.

METHODS

Study Design

This was a retrospective cohort study using data from two large surveys of ambulatory care conducted between 2006 and 2010 by the National Center for Health Statistics: the National Hospital Ambulatory Care Survey (NHAMCS) for ED encounters and the National Ambulatory Care Survey (NAMCS) for outpatient clinic visits. Both NHAMCS and NAMCS are publicly available data sets that contain no patient-identifiable information; as such, this study was deemed to not be human subjects' research by the institutional review board at George Washington University.

Study Setting and Population

Both NHAMCS and NAMCS data use a stratified probability sample methodology to generate national-level estimates of outpatient encounters. NHAMCS samples are drawn from records taken from approximately 400 hospitals nationwide each year, while NAMCS samples are selected from the American Medical Association and American Osteopathic Association master files stratified by specialty. Detailed descriptions of NHAMCS and NAMCS are available elsewhere.[8,9]

From 2006 to 2010, NHAMCS and NAMCS samples comprised a total of 175,351 and 154,421 patient encounters, respectively. After applying survey weights, these encounters represented an estimated 625,670,520 (95% confidence interval [CI] = 572,006,471 to 679,334,569) U.S. ED encounters and 4,898,842,784 (95% CI = 4,494,236,951 to 5,303,448,617) outpatient clinic encounters.

Study Protocol

We used International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9) codes to identify encounters with UTI, URI, and SSTI as the primary diagnosis. For UTI we included ICD-9 codes 595.0, 595.89, 590.xx, and 599.0; for URI 460, 465.9, 381.0, 381.4, 382.0, 382.4, 382.9, 466.0, 499, 462,463, 461, and 473; and for SSTI 680, 681, 682, 684, 704.8, 705.83, 675.1, and 675.2. To maximize comparability across clinical settings, we excluded patients who were admitted to the hospital (NHAMCS) or referred to an ED (NAMCS) from all further analyses. We restricted analyses to visits in which the patient was age 18 years or older. We also conducted two planned sensitivity analyses that defined lower-acuity infections in different ways, as these may be more directly comparable to outpatient clinic visits. In one analysis, we compared our main results with a subset of patients assessed at triage as being able to wait to see a provider for 1 hour or more ("low-acuity"). A second sensitivity analysis excluded patients with two or more systemic inflammatory response syndrome (SIRS) criteria, specifically a triage heart rate ≥ 90 beats/min, a temperature of ≥100.4 or ≤ 96.8°F, and respiratory rate ≥ 20 breaths/min.

In both samples, we tabulated the total number of patients presenting with each diagnosis category, the top five reasons for visit, and the proportion of patients who received laboratory testing and imaging studies including computerized tomography (CT), x-ray, and ultrasound. We tabulated several demographic variables, including mean patient age, race and ethnicity, and payer status. We also tabulated proportions of visits occurring in each census region and whether the visits took place in a metropolitan statistical area. For the NHAMCS sample, we calculated the mean pain score reported by patients in each diagnostic group as well as the proportion of patients who presented to the ED outside of normal business hours, defined as 9:00 a.m. to 5:00 p.m. For the NAMCS sample, we tabulated the proportion of visits in which the physician reported being the patient's primary care physician.

To examine treatment differences across conditions and clinical settings, we first tabulated the 50 most commonly prescribed drugs for each diagnosis group. From this list, we grouped each drug by class. We then tabulated the proportion of patients who received each class of drug, as well as whether each patient received any antibiotic, pain medication, or antiemetic. A full list of medications and their corresponding codes can be found in Data Supplement S1.

Data Analysis

Data analyses were conducted in Stata, version 12 (College Station, TX) using appropriate commands to account for the survey-weighted design of NHAMCS and NAMCS. T-test and chi-square tests were used to compare outpatient clinic versus ED settings, using survey weights. A p-value < 0.05 was considered significant.

RESULTS

From 2006 to 2010, there were an estimated 40,915,587 ambulatory visits for patients with a primary diagnosis of UTI; nearly a quarter were seen in the ED. Patients being seen for UTI in the ED tended to be younger and disproportionately of black race and had Medicaid or self-pay insurance status (Table 1). More than 70% of ED visits occurred outside of routine office hours. Of the estimated 168,286,504 ambulatory visits for URI, 10.8% occurred in ED settings. Demographic differences were similar to those for UTI (Table 2). Of the estimated 34,804,272 SSTI visits between 2006 and 2010, broad demographic differences in ED settings versus outpatient clinic settings were similar to those for UTI and URI. A substantial proportion of patients seen in office-based ambulatory settings for the three types of infection were not seen by the patients' own primary care physicians (ranging from 30% for URI to 56% for UTI).

Reason for Visit

Presenting reasons for visit were similar for URI and SSTI comparing ED versus outpatient settings; however, significant differences were noted for UTI. The top five reasons for visit for those with UTI diagnoses in the ED were abdominal pain (12.7%), painful urination (9.7%), side or flank pain (7.7%), UTI not otherwise specified (4.6%), and hematuria (4.5%). For outpatient visits, the top five reasons were UTI (26.8%), painful urination (16.0%), frequency and urgency of urination (10.3%), other urinary dysfunction (4.1%), and bladder infection (3.5%).

Resource Utilization

Patients with UTI presenting to the ED had blood tests in 54.2% of visits, compared to 22.2% of outpatient visits ($p < 0.001$). Urinalysis was performed in the ED more frequently compared to the outpatient setting ($p < 0.001$). The use of any imaging for UTI was significantly higher in the ED ($p < 0.001$). Comparison across settings for CTs and x-rays was not possible due to insufficient cell sizes in the NAMCS sample. There were no differences in the rate of ordering ultrasound (outpatient setting 4.6%, ED 3.8%; $p = 0.42$; Table 1). For URI, patients in the ED had laboratory tests done more frequently compared to the outpatient setting ($p < 0.001$), and a significantly greater proportion had plain x-rays performed in the ED setting (Table 2). Similar proportions of patients with SSTI received blood tests in the ED compared to the outpatient setting. ED SSTI visits were more likely to include imaging studies than outpatient visits (16.3% vs. 4.6%; $p < 0.001$). Incision and drainage was performed in 23% of ED visits for SSTI; these data were not available for the outpatient setting (Table 3).

Medication Use

Pain medications were frequently prescribed for ED patients for all three infections (Tables 1–3); 22.7% of patients with UTI and 34.4% of SSTI visits received narcotic analgesics during their visits. Antiemetics were frequently prescribed for ED patients with UTI (20.6%); for URI, beta agonists and systemic steroids were more frequently used in the ED setting ($p < 0.001$).

Tables 1, 2, and 3 display the proportions of patients with UTI, URI, and SSTI treated in the ED and outpatient settings who received antibiotic therapy. A total of 84.7% of ED visits, compared to 69.7% of outpatient visits, with a diagnosis of UTI received any antibiotic, with more patients being prescribed fluoroquinolones in the ED compared to outpatient setting ($p < 0.001$). Similar proportions of UTI visits in each setting included prescriptions for nitrofurantoin or trimethoprim-sulfamethoxazole (TMP-SMX). Over half of both ED and clinic patients and received antibiotics for their URIs, with the most common antibiotic prescription in both settings being macrolides (21%). Eleven percent of outpatient visits for URI included fluoroquinolones compared to 5.3% in ED visits ($p < 0.001$). More ED patients compared to clinic patients with SSTI received antibiotics ($p < 0.001$). The most common antibiotic prescribed for SSTI in both the ED and the outpatient setting was TMP-SMX, with patients in the ED being significantly more likely to receive TMP-SMX ($p < 0.001$).

Sensitivity Analyses

Conducting our primary analyses with further restrictions (low-acuity visits and patients without two or more SIRS criteria) resulted in broadly similar results, with few notable differences. Lower-acuity UTI patients were less likely to receive blood testing (37.2% vs. 54.0%) as were SSTI patients (16.5% vs. 25.0%). Other results did not differ meaningfully from the main analysis.

DISCUSSION

Our study provides the most recent comprehensive national sample comparison of the management of common infections for adults in ED and outpatient settings. Previous studies using the NHAMCS data have focused on ED visits, older adults, or children.[10–13] We found that ambulatory ED patients with UTI, URI, and SSTI have different demographic characteristics compared to those treated in the outpatient setting in the United States from 2006 through 2010, with significant differences in treatment setting by age, race, and insurance. Furthermore, two-thirds or more of these encounters occurred in EDs during off-hours. These differences support the literature suggesting that poor access to outpatient clinics, either because patients cannot be seen in a timely manner or because they cannot been seen when it is convenient, may be major factors driving people to EDs in favor of outpatient clinics.[2,3,5,7]

To our knowledge, this is the first direct comparison of ED and outpatient settings for ambulatory acute infections using a nationally representative sample. While we have identified some potential associations that exist, this study is unable to identify a cause and effect relationship for most of these and thus relies in part on assumptions regarding the findings. For example, the fact that younger patients tended to use EDs across all settings similarly suggests that ED use may be related to access because younger adult patients may be less likely to have regular medical providers.

Previous studies have documented that black patients and persons with Medicaid coverage favor EDs.[7,14] Approximately 10% of nonelderly patients with Medicaid seek the ED for low-acuity symptoms, compared to 7% for those with private insurance.[15] Similar disparities have been reported in access to care and use of services in children. Transportation barriers identified in pediatric patients likely also affect adults,[16] and this and other factors may lead to a higher rate of Medicaid ED visit rates for infection-related visits compared to the national average.[17]

Across all three infections, clinical factors may be guiding choice of treatment location, including acute pain in the case of UTI. In addition, ED providers are able to perform incision and drainage for cutaneous abscesses, a service that may not be available in many outpatient clinics. A study of pediatricians found that 90% had been trained to perform incision and drainage, one-third found it too time-consuming, and half were interested in further training.[18] It is possible that family practitioners and internists may be constrained by the same practices. For UTI, the higher use of pain medication and greater proportion of patients with abdominal or flank symptoms suggests that patients with more severe symptoms and those with upper urinary tract disease (i.e., pyelonephritis) tend to favor EDs over outpatient clinics.[19,20]

There was higher use of diagnostic testing in EDs compared to outpatient clinic settings in general. Several reasons may explain this, such as higher severity of illness, patient expectations, and changing standards of care in EDs and hospitals, particularly regarding use of advanced imaging. It is also important to note that our sample excluded admitted patients. For the entire UTI population, 17.2% of ED patients were admitted compared to 0% being referred directly to the ED from outpatient clinics, reinforcing the systematic differences between the ED and outpatient UTI population. Regarding the use of advanced imaging, studies have reported higher rates in CT use in the ED in recent years, with an almost 10-fold increase in CT use for abdominal pain and flank pain,[21] with 33% of visits for abdominal pain and 43% of visits for flank pain involving CT scans by 2007.[22] In addition, over the past 10 years, an increasingly intense diagnostic approach has been noted across all ED visits, with 49% of ED patients receiving laboratory tests in 2008, compared to 34% in

2001.[23] For URI, higher numbers of patients received imaging tests, with the largest differences being in plain x-rays, likely to exclude pneumonia.

We noted a substantial difference in pain medication use where 26% of UTI patients in the ED received narcotics compared to 2% of outpatient visits, and 34% of patient visits for SSTI involved narcotics compared to 9% in the outpatient setting. The greater use of pain medication in the ED may be related to perceived severity of illness or higher degree of pain prompting immediate care-seeking rather than waiting for scheduled appointments. This has been documented for other clinical conditions, including pain-related conditions, heart failure, and mental illness.[19,20]

An important finding in this study is that antibiotic use seems to be suboptimal in both EDs and outpatient clinics. The majority of UTIs are treated with broad-spectrum fluoroquinolones in both the ED and the outpatient settings, suggesting underuse of first-line agents such as nitrofurantoin and TMP-SMX as recommended by the Infectious Disease Society of America guidelines.[24] While our data set did not permit us to determine whether an infection was complicated, it is highly unlikely that the majority of patients with UTI required broad-spectrum antibiotics as a first-line agent. In addition, nearly half of patients received antibiotics for URI in both settings. Similarly, there was insufficient detail as to why antibiotics were used, but, in general, URIs are not antibiotic-responsive, suggesting that there may be systematic overuse of antibiotics in both settings. We found a significantly higher proportion of antibiotic use for URI compared to a previous study using NHAMCS. In our study 53% of ED patients with URI received antibiotics, compared to reported rates of 35% using data through 2004[25]; however, that study included pediatric patients older than 2 years of age and only included the ICD-9 code 465.9, a stricter definition of URI. We believe that our inclusion of a broad range of URI diagnoses provides a more accurate picture of antibiotic overuse. Our results excluded lower respiratory tract infections and are comparable to the 65% rate of antibiotic prescriptions for URI found in a previous report using a broader range of ICD-9 codes.[26]

A lower proportion of outpatients with UTI did not receive antibiotics for a traditionally antibiotic-sensitive condition, suggesting perhaps increased comfort with waiting for results of urine testing compared to the ED where follow-up systems may not be in place. The lower proportion of antibiotic use for SSTI in the outpatient setting could reflect more superficial infections; alternatively, given that over 20% of ED visits included incision and drainage (presumably for cutaneous abscesses, many of which can be treated without antibiotics), this could reflect an overuse of antibiotics for uncomplicated abscesses in the ED.[27]

LIMITATIONS

While the NAMCS and NHAMCS data are nationally representative samples, it is possible that sampling and coding errors could have led to over- or underestimation of specific diagnoses. The inability to evaluate clinical factors limits our findings on antibiotic overuse and misuse because we were unable to assess the reasons for specific antibiotic choices. The same holds true for diagnostic testing choices in both populations. However, because we only included primary diagnoses in our analysis, it is probable that our study provides an underestimate, rather than and overestimate, of antibiotic use in this population, as patients in whom infection were diagnosed but were not the primary diagnosis were excluded. An alternate strategy would have been to use the reason for visit to identify potential cases of UTI, URI, and SSTI based on reasons for visit rather than relying solely on ICD-9 codes. However, we feel that this approach is limited because of the poor correlation between presenting symptoms and final diagnosis.[28] While additional granularity is available through requesting additional data, the authors used only the online publicly available data in the analyses and did not include the geographic specificity available through the Centers for Disease Control and Prevention.

Finally, the comparison of ED patients to outpatients may not be externally valid; for example, patients seen after hours in the ED may be more ill, procedures could not be accounted for in the NAMCS data set, and demographic differences may be associated with a higher likelihood of more severe illness. Nonetheless, we attempted to ascertain this potential spectrum bias through sensitivity analyses and did not find differences outside of the use of laboratory testing. In addition, we excluded patients who were directly referred to the ED by their primary care doctors to reduce bias from those who might have failed outpatient therapy prior to their ED visits.

CONCLUSIONS

Emergency departments treated a considerable proportion of ambulatory infections between 2006 and 2010 in the United States. Patient factors, including the presence of acute pain and access to care, appeared to influence choice of care setting. Observed antibiotic use in both settings suggests a need for heightened vigilance toward optimizing antibiotic use. Future work should focus on determining predictors of antibiotic use in ambulatory settings.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Demographic Characteristics and Resource Utilization for Patient Visits for UTI in the ED Compared to Outpatient Settings

Characteristic	ED Total	ED UTI Estimate, % (95% CI)	Clinic Total	Clinic UTI Estimate, % (95% CI)	p-value
Total	2,620	9,794,387 (8,776,570–10,812,204)	1,038	31,121,200 (27,038,526–35,203,874)	0.001
Mean age, yr	—	42.9 (41.8–43.9)	—	52.0 (50.0–53.9)	0.001
Race/ethnicity					
White	1,888	72.5 (68.6–76.0)	867	85.7 (81.6–89.0)	0.001
Black	589	23.4 (20.0–27.2)	121	11.0 (8.1–14.9)	0.001
Other race	143	4.1 (3.0–5.6)	50	3.3 (2.1–5.2)	0.41
Payer status					
Private insurance	987	38.6 (35.6–41.6)	608	65.2 (60.8–69.3)	0.001
Medicare	562	20.6 (18.6–22.7)	336	29.8 (25.9–34.0)	0.001
Medicaid	699	24.9 (22.6–27.3)	109	7.4 (5.4–10.1)	0.001
Self-pay	528	22.9 (19.9–26.3)	88	7.4 (5.4–10.2)	0.001
Other pay	184	6.5 (5.0–8.6)	84	5.3 (3.7–7.7)	0.35
Region					
Northeast	543	15.4 (13.0–18.1)	189	14.0 (10.7–18.1)	0.75
Midwest	507	19.1 (15.4–23.5)	225	21.9 (17.4–27.0)	
South	1,046	46.7 (41.6–51.9)	408	44.7 (38.9–50.6)	
West	524	18.8 (14.9–23.5)	216	19.4 (14.8–25.1)	
MSA					
MSA	2,230	80.3 (67.8–88.7)	924	87.0 (77.1–93.0)	0.03
Non-MSA	390	19.7 (11.3–32.2)	114	13.0 (7.0–22.9)	
Seen by patient's primary care physician	—	—	443	54.2 (48.3–60.1)	—
Seen by midlevel provider	339	2.0 (1.7–2.4)	66	1.0 (0.7–1.4)	0.03
Seen by resident/intern	246	2.6 (2.2–3.2)	—	—	—
Resource use					
Blood labs	1,398	54.2 (51.5–56.9)	208	22.2 (18.6–26.2)	0.001
Urinalysis	2,338	88.7 (86.8–90.4)	733	71.3 (65.8–76.3)	0.001
Any imaging	796	31.5 (29.1–34.0)	143	9.0 (6.9–11.7)	0.001
CT	305	15.3 (13.4–17.5)	24*	1.8 (0.9–3.7)	*

Characteristic	ED Total	ED UTI Estimate, % (95% CI)	Clinic Total	Clinic UTI Estimate, % (95% CI)	p-value
X-ray	423	16.5 (14.8–18.4)	21*	1.6 (0.9–2.9)	*
Ultrasound	103	3.8 (2.9–5.1)	69	4.6 (3.2–6.6)	0.42
Weekend or nonbusiness hours	1,850	70.4 (67.8–72.8)	—	—	—
Commonly used medications					
Fluoroquinolones	1,262	47.3 (44.5–50.2)	318	35.4 (31.8–39.1)	0.001
Trimethoprim	497	20.0 (17.6–22.5)	155	15.2 (12.3–18.6)	0.02
Nitrofurantoin	239	9.3 (7.9–11.0)	159	15.6 (12.3–19.5)	0.001
Cephalosporin	395	15.1 (13.3–17.0)	41	4.1 (2.6–6.4)	0.001
Antiemetics	470	20.6 (18.4–23.0)	15*	2.1 (1.1–4.0)	*
NSAIDs	430	17.1 (15.3–19.1)	60	6.9 (4.9–9.6)	0.001
Narcotics	526	22.7 (20.1–25.5)	22*	2.1 (1.1–3.9)	*
Other analgesics	559	21.2 (19.3–23.2)	56	7.1 (4.9–10.2)	0.001
Any antibiotic	2,232	84.7 (82.5–86.7)	669	69.7 (65.6–73.6)	0.001

MSA = metropolitan statistical area; NSAIDs = nonsteroidal anti-inflammatory drugs; UTI = urinary tract infection.

*Insufficient cell sizes for generating reliable national-level estimates per National Center for Health Statistics guidelines.

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Table 2

Demographic Characteristics and Resource Utilization for Patient Visits for URI in the ED Compared to Outpatient Settings

Characteristic	ED Total	ED URI Estimate, % (95% CI)	Clinic Total	Clinic URI Estimate, % (95% CI)	p-value
Total	4,903	18,169,810 (16,252,001–20,087,619)	3,866	150,116,694 (132,907,097–167,326,291)	0.001
Mean age, yr	—	36.8 (36.2–37.4)	—	46.8 (45.9–47.7)	0.001
Race/ethnicity					
White	3,329	67.5 (63.2–71.6)	3,227	85.1 (82.4–87.4)	0.001
Black	1,397	29.4 (25.4–33.7)	416	9.7 (7.7–12.1)	0.001
Other	177	3.1 (2.3–4.2)	223	5.2 (3.8–7.1)	0.002
Payer status					
Private insurance	1,869	37.8 (35.5–40.2)	2,675	75.3 (72.7–77.7)	0.001
Medicare	516	11.0 (9.7–12.5)	624	16.4 (14.7–18.4)	0.001
Medicaid	1,346	26.7 (24.5–29.0)	399	7.6 (6.4–8.9)	0.001
Self-pay	1,081	22.7 (20.4–25.2)	316	6.3 (5.0–7.9)	0.001
Other pay	336	6.9 (5.4–8.7)	229	4.3 (3.0–6.2)	0.037
Region					
Northeast	1,147	18.5 (15.7–21.6)	762	19.1 (15.6–23.2)	0.41
Midwest	1,051	21.6 (17.3–26.5)	946	23.0 (18.8–27.8)	
South	1,892	43.7 (38.5–49.0)	1,319	39.3 (33.9–45.1)	
West	813	16.3 (12.7–20.8)	839	18.6 (14.8–23.0)	
MSA					
MSA	4,108	80.3 (68.5–88.4)	3,365	87.5 (79.2–92.8)	0.001
Non-MSA	795	19.7 (11.6–31.5)	501	12.5 (7.2–20.8)	
Provider seen					
Patient’s primary care physician	—	—	2,346	69.4 (64.5–73.9)	—
Midlevel provider	910	6.1 (5.6–6.8)	240	4.4 (3.6–5.3)	0.001
Resident/intern	336	3.4 (2.9–3.9)	—	—	
Resource use					
Blood labs	975	21.2 (19.2–23.2)	468	14.2 (11.9–16.8)	0.001
Any imaging	1,311	27.3 (25.2–29.5)	310	7.8 (6.3–9.7)	0.001
CT	160	4.2 (3.5–5.1)	85	1.6 (1.1–2.2)	0.001

Characteristic	ED Total	ED URI Estimate, % (95% CI)	Clinic Total	Clinic URI Estimate, % (95% CI)	p-value
X-ray	1,171	24.5 (22.5–26.7)	162	4.8 (3.5–6.6)	0.001
Weekend or nonbusiness hours	3,273	67.6 (65.8–69.3)	—	—	—
Commonly used medications					
Fluoroquinolones		5.3 (4.7–6.1)	391	10.9 (9.6–12.3)	0.001
Penicillins		17.3 (15.8–18.8)	605	16.0 (14.2–17.9)	0.3
Cephalosporins	309	7.3 (5.9–8.9)	157	4.9 (3.4–6.9)	0.02
Macrolides	1,073	21.2 (19.7–22.8)	715	20.6 (18.5–22.8)	0.63
Other antibiotics	127	2.1 (1.6–2.6)	56	1.3 (0.9–1.8)	0.03
Beta agonists	531	11.1 (10.0–12.4)	208	4.8 (3.9–5.9)	0.001
Oral/IV steroids	389	7.9 (6.8–9.1)	149	3.7 (2.9–4.8)	0.001
Topical steroids	72	1.2 (1.3–2.3)	156	3.8 (2.9–4.9)	0.001
Antipyretics	699	14.5 (13.1–16.1)	209	5.7 (4.5–7.2)	0.001
NSAIDs	1,006	20.6 (18.6–22.8)	258	6.3 (5.3–7.5)	0.001
Decongestant	73	1.7 (1.2–2.3)	207	6.3 (4.8–8.1)	0.001
Any antibiotic	2,640	54.2 (52.2–56.3)	2,022	55.0 (52.3–57.6)	0.67

MSA = metropolitan statistical area; NSAIDs = nonsteroidal anti-inflammatory drugs; URI = upper respiratory infection.

*Insufficient cell sizes for generating reliable national-level estimates per National Center for Health Statistics guidelines.

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Table 3

Demographic Characteristics and Resource Utilization for Patient Visits for SSTI in the ED compared to Outpatient Settings

Characteristic	ED Total	ED SSTI Estimate (95% CI)	Clinic Total	Clinic SSTI Estimate (95% CI)	p-value
Total	3,126	11,559,797 (10,302,141–12,817,453)	664	23,244,475 (19,443,913–27,045,037)	0.001
Mean age, yr	—	40.7 (39.6–41.8)	—	52.3 (50.4–54.3)	0.001
Race/ethnicity					
White	2,252	73.2 (68.5–77.4)	550	86.6 (82.5–89.8)	0.001
Black	767	24.7 (20.5–29.5)	77	9.0 (6.4–12.5)	0.001
Other	107	2.1 (1.4–3.2)	37	4.4 (2.5–7.6)	0.01
Payer status					
Private insurance	1,066	35.4 (32.5–38.4)	369	66.2 (61.4–70.8)	0.001
Medicare	459	14.8 (12.9–16.8)	170	27.4 (22.7–32.6)	0.001
Medicaid	732	20.2 (18.2–22.5)	87	7.9 (5.7–11.0)	0.001
Self-pay	884	29.4 (26.4–32.6)	64	6.6 (4.5–9.8)	0.001
Other pay	243	8.1 (6.4–10.1)	70	6.2 (4.1–9.3)	0.3
Region					
Northeast	639	15.3 (13.3–17.5)	109	13.5 (9.9–18.0)	0.03
Midwest	522	17.9 (13.8–23.0)	163	24.5 (18.3–32.0)	
South	1,312	47.2 (41.7–52.7)	205	37.0 (29.4–45.2)	
West	653	19.6 (16.2–23.6)	187	25.1 (19.7–31.3)	
MSA					
MSA	2,775	85.2 (75.1–91.6)	594	91.2 (84.2–95.3)	0.01
Non-MSA	351	14.8 (8.4–24.9)	70	8.8 (4.7–15.9)	
Provider seen					
Patient’s primary care physician	—	—	351	55.7 (47.1–63.9)	—
Midlevel provider	618	4.3 (3.8–4.7)	22*	0.4 (0.2–0.6)	*
Resident or intern	299	2.8 (2.3–3.4)	—	—	—
Resource use					
Blood labs	722	24.7 (22.3–27.1)	110	19.9 (15.5–25.1)	0.1
Any imaging	466	16.3 (14.3–18.5)	31*	4.6 (3.2–6.6)	*
CT	59	2.8 (2.1–3.9)	2*	0.3 (0.0–2.0)	*

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Characteristic	ED Total	ED SSTI Estimate (95% CI)	Clinic Total	Clinic SSTI Estimate (95% CI)	p-value
X-ray	338	11.4 (9.8–13.2)	11*	1.5 (0.8–3.1)	*
Ultrasound	72	2.3 (1.7–3.1)	8*	1.6 (0.8–3.3)	*
Incision and drainage	676	26.3 (23.4–29.6)	—	—	—
Weekend or nonbusiness hours	2,010	64.7 (62.1–67.3)	—	—	—
Commonly used medications					
Cephalosporins	791	25.9 (23.4–28.6)	120	21.8 (17.4–27.0)	0.17
Trimethoprim	986	32.8 (29.8–36.0)	86	14.4 (10.6–19.2)	0.001
Topical antibiotics	117	4.5 (3.5–5.7)	32	5.7 (3.6–9.0)	0.35
Other antibiotics	328	10.9 (9.0–13.3)	20*	2.2 (1.1–4.3)	*
Narcotics	996	34.4 (31.6–37.3)	44	6.6 (4.5–9.7)	0.001
NSAIDs	400	13.6 (11.9–15.6)	45	5.7 (3.8–8.7)	0.001
Topical analgesic	269	8.3 (6.4–10.8)	8*	2.1 (0.9–4.9)	*
Any antibiotic	2,123	69.4 (67.1–71.6)	345	57.6 (51.3–63.8)	0.001

MSA = metropolitan statistical area; NSAID = non steroidal anti-inflammatory drug; SSTI = skin and soft tissue infection.

* Insufficient cell sizes for generating reliable national-level estimates per National Center for Health Statistics guidelines.