Outpatient Antibiotic Prescriptions

United States, 2017

Introduction

Tracking national antibiotic use is an essential public health surveillance activity that allows CDC and its partners to identify opportunities to improve prescribing practices. CDC monitors outpatient antibiotic prescription data to inform antibiotic stewardship priorities and measure progress over time to promote equitable access to quality healthcare and optimize patient safety.

Data Sources

Systemic oral antibiotics were extracted from the IQVIA Xponent® database.[1] IQVIA captured an estimated 90% of outpatient prescriptions dispensed from retail pharmacies for any medication nationally, reconciled them to wholesale deliveries to these pharmacies, and projected to 100% coverage. These data represent all outpatient antibiotic prescriptions from community pharmacies from all payers but exclude federal facilities. Healthcare provider specialties are based on the American Medical Association (AMA) self-designated practice specialties, Drug Enforcement Administration (DEA), and National Provider Identifier (NPI) sources and categorized into one of 17 groups. Provider specialty denominators are estimated by extracting the total number of providers in each provider specialty from the IQVIA Xponent® prescription database. Rates are calculated using provider specialty denominators for 2011 aggregated by IQVIA. Yearly antibiotic prescription rates per 1,000 persons by age, sex, and region are calculated using annual U.S. Census files.

Note: Starting in 2017, enhancements to IQVIA's methodology also take into account that some prescriptions which are ordered may not be picked up by the patient and that patients may not pay for their prescriptions in the way that the pharmacy expects, leading to prescriptions that are ultimately not dispensed. The previous methodology did not account for the return or restocking of these prescriptions filled, but not picked up by patients. Accounting for these situations, which can lead to overstated prescriptions, likely makes the revised methodology data more accurate. However, for comparisons to previous years of estimates the previous methodology data should be used.

TOTAL OUTPATIENT ORAL ANTIBIOTIC PRESCRIPTIONS IN 2017

Previous Methodology: 267.6 million total oral antibiotic prescriptions, at a rate of 821 prescriptions per 1,000 persons

Revised Methodology: 258.2 million total antibiotic prescriptions, at a rate of 793 prescriptions per 1,000 persons

Table 1. Oral antibiotic prescriptions by age, sex, and region – United States, 2017

Characteristics	Number of Antibiotic Prescriptions (Millions)[a]	Antibiotic Prescriptions Per 1,000 Persons, Rate[b]	Number of Antibiotic Prescriptions (Millions)[a]	Antibiotic Prescriptions Per 1,000 Persons, Rate[b]
	Previous methodology[c]		Revised methodology[d]	
Age Group				
<20 years	62.5	760	60.4	735
≥20 years	205.1	842	197.7	812
Sex				
Female	163.0	986	157.1	950
Male	104.5	651	100.9	629
Region				
Northeast	58.7	861	56.7	831
Midwest	48.5	859	46.9	831
South	114.1	923	110.0	890
West	46.3	598	44.6	576

a. Totals may not add to all oral prescriptions due to missing data.
b. Rates were calculated using population data obtained from the 2017 U.S. Census.
c. Estimates created using previous IQVIA methodology.
d. Estimates created using data from revised methodology accounting for reversed and voided prescriptions across weeks.

Table 2. Top oral antibiotic classes and agents – United States, 2017

Characteristics	Number of Antibiotic Prescriptions (Millions)	Antibiotic Prescriptions Per 1,000 Persons, Rate[a]	Number of Antibiotic Prescriptions (Millions)	Antibiotic Prescriptions Per 1,000 Persons, Rate[a]
	Previous methodology[b]		Revised methodology[c]	
Antibiotic Class				
Penicillins	63.1	194	61.3	188
Macrolides	46.1	142	44.6	137
Cephalosporins	37.3	115	36.1	111
Beta-lactams, increased activity	27.5	84	26.7	82
Fluoroquinolones	25.4	78	24.6	76
Antibiotic Agent				
Amoxicillin	57.0	175	55.5	170
Azithromycin	43.6	134	42.2	130
Amoxicillin-clavulanic acid	27.5	84	26.7	82
Cephalexin	22.1	68	21.3	65
Sulfamethoxazole-trimethoprim	19.4	60	18.7	57

a. Rates were calculated using population data obtained from the 2017 U.S. Census.
b. Estimates created using previous IQVIA methodology.
c. Estimates created using data from revised methodology accounting for reversed and voided prescriptions across weeks.

Table 3. Oral antibiotic prescribing by specialty – United States, 2017

Specialty	Number of Antibiotic Prescriptions (Millions)	Antibiotic Prescriptions Per 1,000 Providers, Rate[a]	Number of Antibiotic Prescriptions (Millions)	Antibiotic Prescriptions Per 1,000 Providers, Rate[a]
	Previous methodology[b]		Revised methodology[c]	
Primary Care Physicians	100.8	425	97.4	410
Physician Assistants and Nurse Practitioners	73.5	424	70.9	409
Surgical Specialties	18.7	210	18.1	202
Dentistry	25.6	209	24.9	203
Emergency Medicine	14.1	436	13.6	421
Dermatology	6.5	572	6.1	536
Obstetrics/Gynecology	5.7	152	5.4	144
Other	22.7	109	21.8	105
All Providers	267.6	293	258.2	283

a. Rates were calculated using provider specialty denominators for 2011 aggregated by IQVIA.
b. Estimates created using previous IQVIA methodology.
c. Estimates created using data from revised methodology accounting for reversed and voided prescriptions across weeks.

Figure 1. Antibiotic prescriptions per 1,000 persons by state (sextiles) for all ages – United States, 2017

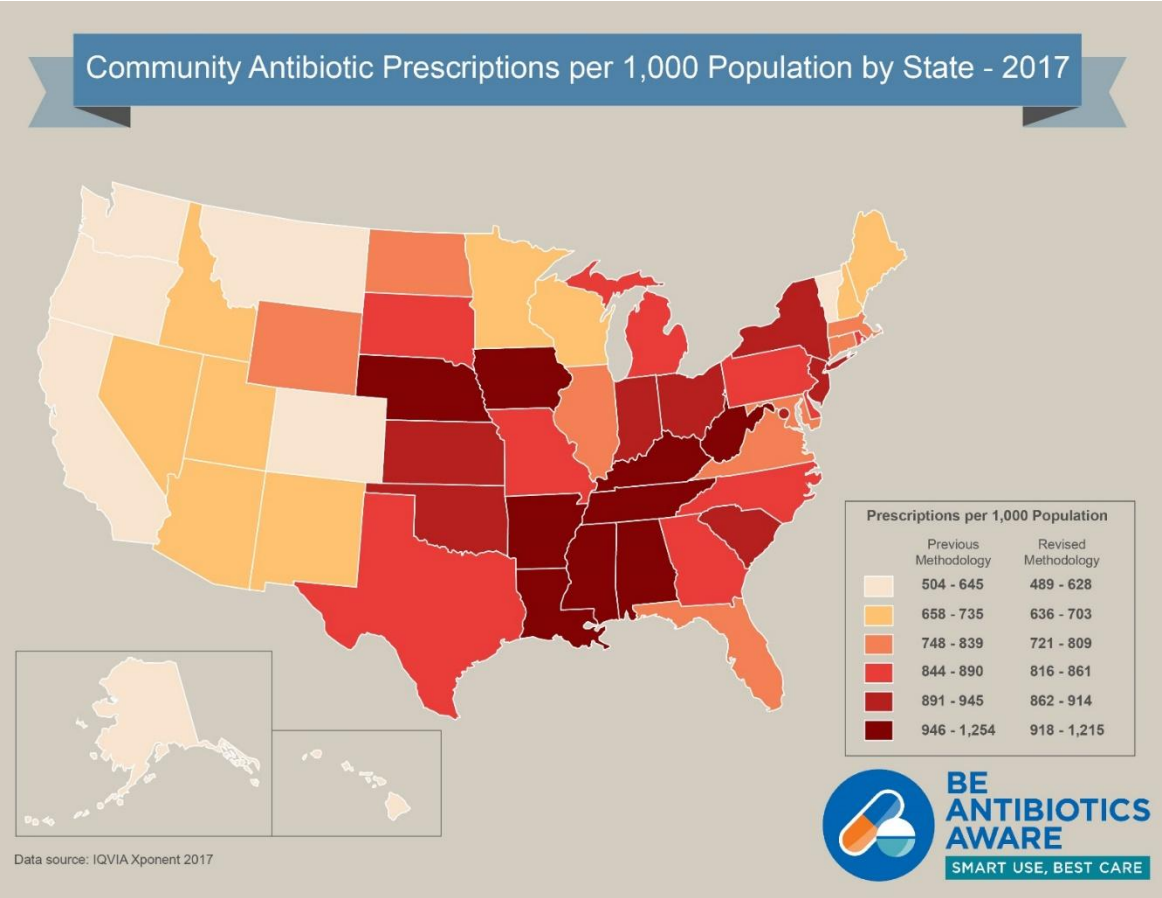

Table 4. Oral antibiotic prescribing by state – United States, 2017

State	Antibiotic Prescriptions Per 1,000 Persons, Rate[a]	
	Previous methodology[b]	Revised methodology[c]
Alabama	1178	1137
Alaska	504	489
Arizona	735	703
Arkansas	1107	1069
California	565	544
Colorado	565	544
Connecticut	839	809
Delaware	885	857
District of Columbia	910	877
Florida	831	799
Georgia	872	841
Hawaii	618	597
Idaho	674	652
Illinois	822	791
Indiana	933	899
Iowa	946	918
Kansas	931	898
Kentucky	1239	1199
Louisiana	1204	1159
Maine	698	677
Maryland	764	738
Massachusetts	748	721
Michigan	885	856
Minnesota	658	636
Mississippi	1222	1182
Missouri	890	861
Montana	617	599
Nebraska	986	954
Nevada	711	683
New Hampshire	724	700
New Jersey	891	862
New Mexico	681	655
New York	899	869
North Carolina	844	816
North Dakota	768	742
Ohio	945	914
Oklahoma	901	869
Oregon	520	502
Pennsylvania	879	852
Rhode Island	883	849
South Carolina	929	898
South Dakota	862	841
Tennessee	1142	1098
Texas	852	820
Utah	725	700
Vermont	645	628
Virginia	784	758
Washington	560	541
West Virginia	1254	1215
Wisconsin	703	678
Wyoming	770	746

a. Rates were calculated using population data obtained from the 2017 U.S. Census.

b. Estimates created using previous IQVIA methodology.

c. Estimates created using data from revised methodology accounting for reversed and voided prescriptions across weeks.

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References

1. Hicks LA, Bartoces MG, Roberts RM, Suda KJ, Hunkler RJ, Taylor TH Jr, Schrag SJ. US outpatient antibiotic prescribing variation according to geography, patient population, and provider specialty in 2011. Clin Infect Dis. 2015 May 1;60(9):1308-16. doi: 10.1093/cid/civ076. Epub 2015 Mar 5. PMID: 25747410.