

cefazolin among patients reporting a beta lactam allergy rose from 48% (16/33) to 100% (12/12). None of these 12 patients experienced adverse reactions as a result of beta lactam exposure. Appropriate antibiotic selection based on MRSA status was high pre- and post-implementation (98.4% vs 99.4%); but significant improvements were made for procedure-specific antibiotic selection (80.5 vs 94.5%; $\chi^2=19.3$, $p < 0.001$) and weight-based dosing (92.5% vs 98.4%; $\chi^2=7.45$, $p=0.006$). **Conclusion:** In this first-ever intervention designed to direct SAP prescribing based on patient specific variables, we significantly improved appropriate SAP selection across a comprehensive list of surgical procedures. Future analysis should include assessing potential reductions in SSIs as result of using the support

Antimicrobial Stewardship & Healthcare Epidemiology 2024;4(Suppl. S1):s17–s18

doi:10.1017/ash.2024.120

Presentation Type:

Poster Presentation - Oral Presentation

Subject Category: Antibiotic Stewardship

Appropriateness of Antibiotic Prescriptions in Emergency Departments in the United States, 2016-2021

Joseph Ladines-Lim, Michigan Medicine and Kao-Ping Chua, University of Michigan

Background: Inappropriate antibiotic prescribing contributes to antimicrobial resistance, a global health threat. Prior studies have used ICD-9-CM codes to estimate inappropriate prescribing rates in ambulatory settings, including emergency departments (EDs), though the last national estimates date back to 2010-2015 (Hersh et al, CID 2021). Using the most recent publicly available data, we estimated inappropriate antibiotic prescribing rates in EDs across all conditions. For further

characterization, we estimated rates of inappropriate antibiotic prescribing with and without codes that could be plausible indications for which antibiotics are prescribed. **Methods:** We analyzed 2016-2021 data from the National Hospital Ambulatory Medical Care Survey, a nationally representative survey of EDs, subsetting to visits with ≥ 1 oral antibiotic prescription. Using ICD-10-CM codes (Chua et al, BMJ 2019), we calculated proportions of visits with inappropriate antibiotic prescribing; inappropriate antibiotic prescribing and ≥ 1 plausible antibiotic-inappropriate indication (e.g., viral infection); and inappropriate prescribing without plausible antibiotic-inappropriate indications. Among visits with plausible antibiotic-inappropriate indications, we subcategorized these further (e.g. viral infection, ophthalmologic conditions). Among visits without plausible antibiotic-inappropriate indications, we determined the most common diagnosis codes. We conducted analyses overall and separately among children (0-17 years), adults (18-64 years), and older adults (≥ 65 years). **Results:** Demographic characteristics by age group are shown in Table 1. Antibiotic prescription rates overall and for children, adults, and older adults were 18.6%, 17.8%, 19.1%, and 18.0%, respectively. Inappropriate prescription rates were 27.6%, 23.7%, 29.8%, and 24.6%, respectively. Inappropriate antibiotic prescription rates with plausible indications were 14.9%, 16.7%, 15.0%, and 12.6%, while inappropriate antibiotic prescription rates without plausible indications were 12.7%, 7.0%, 14.9%, and 12.0%, respectively (Figure 1). Rates of subcategories of

Characteristic	Overall, No. (%) (n = 152,449,442)	Children, No. (%) (n = 31,714,726)	Adults, No. (%) (n = 94,016,603)	Older adults, No. (%) (n = 26,718,112)
Female sex	87,737,545 (57.6%)	15,702,068 (49.5%)	56,638,335 (60.2%)	15,397,141 (57.6%)
Age group, years				
0-1	...	6,631,523 (20.9%)	...	...
2-5	...	9,857,892 (31.1%)	...	...
6-11	...	8,583,401 (27.1%)	...	...
12-17	...	6,641,908 (20.9%)	...	...
18-25	...	...	20,222,873 (21.5%)	...
26-34	...	...	21,959,043 (23.4%)	...
35-44	...	...	19,096,807 (20.3%)	...
45-54	...	...	17,037,165 (18.1%)	...
55-64	...	...	15,700,713 (16.7%)	...
65-74	...	...	...	12,569,714 (47.0%)
75-84	...	...	...	8,825,326 (33.0%)
≥ 85	...	...	...	5,323,071 (19.9%)
Race and ethnicity				
Hispanic, any race	23,919,528 (15.7%)	8,334,426 (26.3%)	13,228,368 (14.1%)	2,356,733 (8.8%)
Non-Hispanic, Black	35,632,730 (23.4%)	8,374,515 (26.4%)	24,175,496 (25.7%)	3,082,719 (11.5%)
Non-Hispanic Other	4,472,256 (2.9%)	1,200,030 (3.8%)	2,294,975 (2.4%)	977,250 (3.7%)
Non-Hispanic, White	88,424,926 (58.0%)	13,805,754 (43.5%)	54,317,762 (57.8%)	20,301,409 (76.0%)
Geographic census region				
Northeast	21,295,859 (14.0%)	4,217,838 (13.3%)	12,695,069 (13.5%)	4,382,952 (16.4%)
Midwest	33,528,031 (22.0%)	7,079,006 (22.3%)	20,382,776 (21.7%)	6,066,249 (22.7%)
South	67,065,134 (44.0%)	14,693,094 (46.3%)	41,778,892 (44.4%)	10,593,148 (39.6%)
West	30,560,415 (20.0%)	5,724,787 (18.1%)	19,159,865 (20.5%)	5,675,762 (21.2%)
Residence in metropolitan statistical area	127,965,999 (83.9%)	26,991,719 (85.1%)	79,395,431 (84.4%)	21,578,848 (80.8%)

Table 1: Demographic characteristics overall and by age group for patients prescribed oral antibiotics in emergency departments in the United States, 2016-2021.

Overall	Children	Adults	Older adults
1. R109: Unspecified abdominal pain	1. R509: Fever, unspecified	1. R109: Unspecified abdominal pain	1. R060: Dyspnea
2. R51: Headache	2. R111: Vomiting	2. R51: Headache	2. R109: Unspecified abdominal pain
3. R112: Nausea with vomiting, unspecified	3. R109: Unspecified abdominal pain	3. R112: Nausea with vomiting, unspecified	3. R197: Diarrhea, unspecified
4. R060: Dyspnea	4. R05: Cough	4. R101: Pain localized to upper abdomen	4. R112: Nausea with vomiting, unspecified
5. R509: Fever, unspecified	5. R197: Diarrhea, unspecified	5. R060: Dyspnea	5. R51: Headache
6. R111: Vomiting	6. R112: Nausea with vomiting, unspecified	6. R103: Pain localized to other parts of lower abdomen	6. R101: Pain localized to upper abdomen
7. R197: Diarrhea, unspecified	7. R51: Headache	7. R197: Diarrhea, unspecified	7. R05: Cough
8. R101: Pain localized to upper abdomen	8. R21: Rash and other nonspecific skin eruption	8. R111: Vomiting	8. R509: Fever, unspecified
9. R05: Cough	9. R103: Pain localized to other parts of lower abdomen	9. R110: Nausea	9. R111: Vomiting
10. R103: Pain localized to other parts of lower abdomen	10. R098: Other specified symptoms and signs involving the circulatory and respiratory systems	10. R05: Cough	10. R110: Nausea

Table 2: Most frequent diagnosis codes for potential signs and symptoms of infection for inappropriate antibiotic prescriptions with plausible antibiotic-inappropriate indications in emergency departments in the United States, 2016-2021.

Overall	Children	Adults	Older adults
1. I10: Essential (primary) hypertension	1. S099: Unspecified injury of face and head	1. R079: Chest pain, unspecified	1. I10: Essential (primary) hypertension
2. R079: Chest pain, unspecified	2. M255: Pain in joint	2. I10: Essential (primary) hypertension	2. R079: Chest pain, unspecified
3. M255: Pain in joint	3. K590: Constipation	3. M255: Pain in joint	3. M255: Pain in joint
4. R078: Other chest pain	4. S934: Sprain of ankle	4. R078: Other chest pain	4. R55: Syncope and collapse
5. M796: Pain in limb, hand, foot, fingers and toes	5. R458: Other symptoms and signs involving emotional state	5. F419: Anxiety disorder, unspecified	5. I489: Unspecified atrial fibrillation and atrial flutter
6. F419: Anxiety disorder, unspecified	6. K529: Noninfective gastroenteritis and colitis, unspecified	6. M796: Pain in limb, hand, foot, fingers and toes	6. R42: Dizziness and giddiness
7. R55: Syncope and collapse	7. S060: Concussion	7. M545: Low back pain	7. E119: Type 2 diabetes mellitus without complications
8. M545: Low back pain	8. F329: Major depressive disorder, single episode, unspecified	8. F329: Major depressive disorder, single episode, unspecified	8. R531: Weakness
9. F329: Major depressive disorder, single episode, unspecified	9. M796: Pain in limb, hand, foot, fingers and toes	9. R458: Other symptoms and signs involving emotional state	9. I509: Heart failure, unspecified
10. R42: Dizziness and giddiness	10. T148: Other injury of unspecified body region	10. F179: Nicotine dependence	10. N179: Acute kidney failure, unspecified

Table 3: Most frequent diagnosis codes for inappropriate antibiotic prescriptions without plausible antibiotic-inappropriate indications in emergency departments in the United States, 2016-2021.

inappropriate prescribing with plausible antibiotic indications overall and by age group are shown in Figure 2, with the most common diagnoses for potential signs and symptoms of infection in Table 2. The most common diagnoses for inappropriate prescribing without plausible indications are in Table 3. **Conclusions:** Inappropriate antibiotic prescriptions in EDs are common with a substantial proportion without plausible conditions. Most inappropriate prescriptions with plausible antibiotic-inappropriate indications are associated with potential signs and symptoms of infection without a more definitive diagnosis code, suggesting either diagnostic uncertainty or poor coding quality. Future work should distinguish between these two possibilities to determine whether stewardship efforts should focus on educational strategies to avoid unnecessary empiric antibiotic prescribing in the setting of diagnostic uncertainty, improving coding quality, or both.

Antimicrobial Stewardship & Healthcare Epidemiology 2024;4(Suppl. S1):s18–s19
 doi:10.1017/ash.2024.121

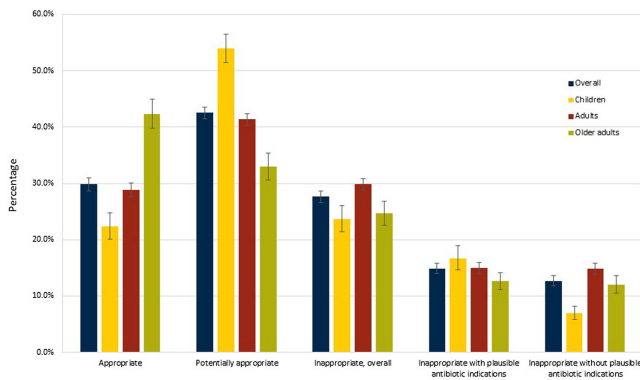


Figure 1: Rates of appropriateness of antibiotic prescriptions overall and by age group in United States emergency departments, 2016-2021. The proportion of visits with inappropriate antibiotic prescribing (third set of bars) equals the proportions in the fourth and fifth sets of bars

Presentation Type:

Poster Presentation - Oral Presentation

Subject Category: Antibiotic Stewardship

Changes in outpatient antibiotic prescriptions by U.S. physicians and advanced practice providers, 2011 and 2022

Mohsin Ali, Centers for Disease Control and Prevention (CDC); Guillermo Sanchez, Centers for Disease Control and Prevention (CDC); Katryna Gouin, Centers for Disease Control and Prevention (CDC); Adam Hersh, University of Utah and Sarah Kabbani, Centers for Disease Control and Prevention (CDC)

Background: The number of advanced practice providers (APPs)—nurse practitioners (NPs) and physician assistants (PAs)—continues to expand across the United States. Several studies suggest differences in antibiotic

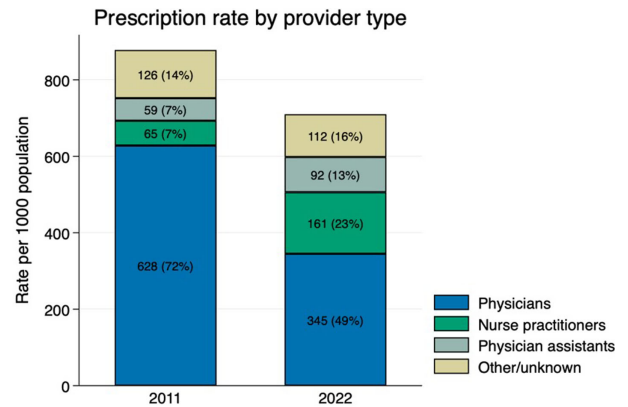


FIGURE 1. Outpatient antibiotic prescription volume and rate by provider type, 2011 and 2022

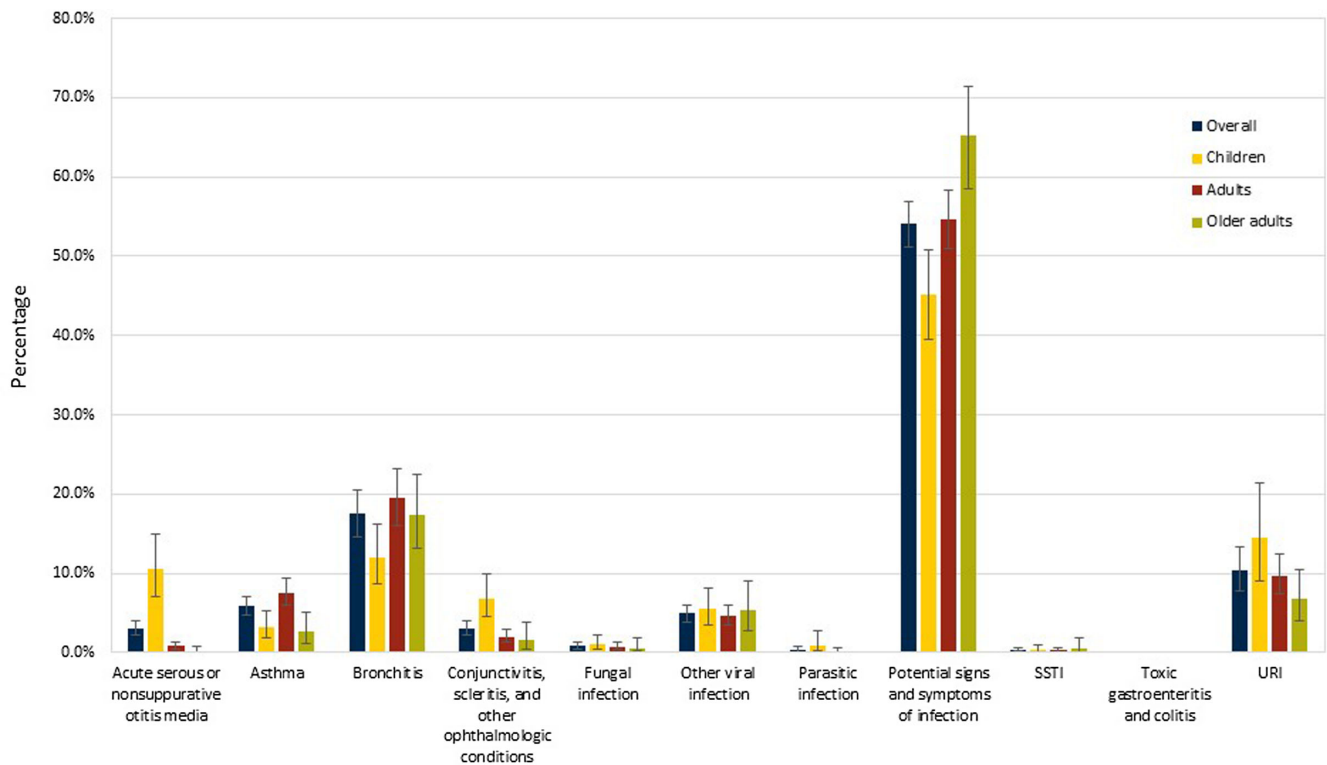


Figure 2: Rates of antibiotic prescriptions for plausible antibiotic-inappropriate coded indications by age group and diagnosis subcategory in United States emergency departments, 2016-2021. Each visit was assigned to a single indication such that the proportions sum to 100%. Abbreviations: SSTI = skin and soft tissue infection, URI = upper respiratory infection.