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Patterns of Antibacterial Use and Impact of Age, Race-Ethnicity, and Geographic Region on Antibacterial Use in an Outpatient Medicaid Cohort

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Abstract

STUDY OBJECTIVES—To describe patterns of outpatient antibacterial use among California Medicaid (Medi-Cal) fee-for-service system beneficiaries, and to investigate the influence of demographic factors—age, race-ethnicity, state county, and population density—on those patterns.

DESIGN—Retrospective analysis of administrative claims data.

DATA SOURCE—Medi-Cal fee-for-service system claims database.

PATIENTS—All outpatient Medi-Cal fee-for-service system beneficiaries enrolled between 2006 and 2011 who had at least one systemic antibacterial claim.

MEASUREMENTS AND MAIN RESULTS—Rates of antibacterial prescribing and the proportion of broad-spectrum antibacterial use were measured over the study period and among age, racial-ethnic and geographic (county) groups. Of the 10,018,066 systemic antibacterial claims selected for analysis, antibacterial prescribing rates decreased from 542 claims/1000 beneficiaries in 2006 to 461 claims/1000 beneficiaries in 2011 ($r = -0.971$, $p = 0.0012$; τ-b $= -1.00$, $p = 0.009$). Among age groups, children had the highest rate of use (605 claims/1000 beneficiaries, χ^2 (2) = 320,000, $p < 0.001$); among racial-ethnic groups, Alaskan Natives and Native Americans had the highest rate of use (1086/1000 beneficiaries, χ^2 (5) = 197,000, $p < 0.001$). Broad-spectrum antibacterial prescribing increased from 28.1% (95% confidence interval [CI] 28.1–28.2%) to 32.7% (95% CI 32.6–32.8%) over the study period. Senior age groups and Caucasians received the highest proportions of broad-spectrum agents (53.4% [95% CI 52.5–54.3%] and 36.6% [95% CI 36.6–36.7%], respectively). Population density was inversely related to both overall antibacterial use ($\rho = -0.432$, $p = 0.0018$) and broad-spectrum antibacterial prescribing ($\rho = -0.359$, $p < 0.001$). The rate of prescribing decreased over the study period for all antibacterial

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classes with the exception of macrolides and sulfonamides. Amoxicillin was the most frequently prescribed agent.

CONCLUSION—Overall and broad-spectrum antibacterial use in the Medi-Cal fee-for-service program are less than that observed nationally. Significant variations in prescribing exist between age and racial-ethnic groups, and heavily populated areas are associated with both less antibacterial use and less broad-spectrum antibacterial prescribing. Studies are needed to determine the reasons for the observed differences in antibacterial use among demographic groups.

Keywords

Antibiotic management; Medicaid; Epidemiology; Infectious disease; Community practice

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Antibacterial drug resistance is a substantial public health threat, resulting in limited options for the treatment of infection. Geographic areas with high antibacterial consumption are associated with increased antibacterial resistance.[1–2] Furthermore, broad-spectrum antibacterials are more likely to be associated with the development of resistance compared with those with a narrower spectrum.[3] Thus, avoidance of unnecessary use of antibacterials, particularly unnecessary broad-spectrum antibacterials, is a critical public health objective.

Surveillance of antibacterial consumption among outpatients in particular is an important healthcare quality surveillance measure, as most antibacterial prescribing occurs in the outpatient setting.[1, 4] Outpatient antibacterial prescribing contributes to antibacterial resistance,[5] and community-acquired infections secondary to resistant bacteria such as *Streptococcus pneumoniae, Staphylococcus aureus*, and *Escherichia coli* are increasingly common.[6–8] Respiratory tract infections are the most frequent indication for antibacterials in the outpatient setting,[9–10] and considering that most outpatient respiratory tract infections are viral in origin, antibacterial prescribing for these infections requires particular attention.[10] Furthermore, those antibacterials prescribed for respiratory tract infections are frequently broad spectrum, including macrolides and fluoroquinolones.[9]

Certain demographic factors are established predictors of the quantity and type of outpatient antibacterial prescribing, such as age[11–12] and geographic region. [4, 13–15] Race-ethnicity may also influence quantity and scope of antibacterial use.[14, 16–19] As an example, African-Americans have been found to be less likely than other groups to receive broad-spectrum antibacterials[14] and more likely to receive unnecessary antibacterials for uncomplicated upper respiratory tract infections.[19]

California is a state with substantial racial-ethnic diversity and many distinct geographic regions. Nearly a quarter of California residents are enrolled in California Medicaid (i.e., Medi-Cal). [20] Medi-Cal is a health insurance system for California residents who are characterized as low income or disabled. Its enrollees include vulnerable subgroups such as pregnant women, children, the elderly, and patients with multiple comorbidities. [21] Greater than 40% of California residents <18 years of age are insured by Medi-Cal.[22]

To our knowledge, antibacterial usage patterns in the Medi-Cal patient population have not been characterized. However, evidence that insurance type influences both antibacterial prescribing rates and the likelihood of receiving broad-spectrum antibacterials underscores the importance of examining antibacterial prescribing patterns in this system.[9, 14–15]

The objective of our study was to describe patterns of outpatient antibacterial use in California Medi-Cal fee-for-service program beneficiaries. Goals included characterization of overall antibacterial prescribing and of the proportion of overall prescribing considered broad spectrum. A secondary objective was to investigate the influence of demographic factors—age, race-ethnicity, state county, and population density—on antibacterial use.

Methods

Study Design

This was a retrospective analysis of administrative claims data; institutional review board approval was not necessary for this study since all claims were de-identified.

Data Source

Individual fee-for-service antibacterial claims from January 1, 2006–December 31, 2011, were obtained from the California Department of Health Care Services. Information included county of service and patients' age and ethnicity.

California population estimates per year and per county, as well as California land area estimates per county, were collated from the California Department of Finance.[23–25] Medi-Cal fee-for-service enrollment numbers per county, per age group, and per ethnic group were collected from the California Department of Health Care Services.[26–34]

Antibacterial Classification

Systemic antibacterials were identified by using drug name and National Drug Code. Antibacterials used primarily for tuberculosis, leprosy, and noninfectious chemotherapy were excluded from the analysis.

Following precedent from the literature and from the National Committee for Quality Assurance's Healthcare Effectiveness Data and Information Set (HEDIS) measures, antibacterials were further categorized as broad or narrow spectrum based on their potential for influencing antibacterial resistance, as well as their spectrum of activity.[15, 35] Table 1 details the broad- and narrow-spectrum antibacterial groupings used in this study.

Statistical Analysis

Pearson product-moment and Kendall τ-b rank correlation were used to analyze prescribing rates over time. The χ^2 goodness of fit test was used to test for significant differences in prescribing rates between age and racial-ethnic groups. Binomial exact confidence intervals (CIs) were constructed to compare proportions of broad-spectrum antibacterials and major antibacterial classes.

Spearman rank correlation was used to examine the relationship of population density to total and broad-spectrum prescribing by county. Correlations were performed for individual years and averaged. Counties with fewer than 500 fee-for-service beneficiaries were excluded from analysis during years with < 500 beneficiaries (Sierra county in 2006–2009 and 2011). In addition, those counties that transitioned from Medi-Cal fee-for-service to Medi-Cal managed care (San Luis Obispo county in 2008, Merced and Sonoma counties in 2009, and Fresno, Kings, Madera, Marin, Mendocino and Ventura counties in 2011) were excluded from analysis for the specific year of their transition.[36]

Stata SE12 statistical software (StataCorp, College Station, TX) was used for analysis. The Centers for Disease Control and Prevention Epi Info 7 software program was used to construct the map of systemic antibacterial claims per fee-for-service beneficiary by county.

Results

A total of 12,043,661 individual fee-for-service antibacterial claims from January 1, 2006–December 31, 2011, were obtained from the California Department of Health Care Services. Information regarding county of service and patients' age and race-ethnicity was available for ≥ 92.5% of claims for each year. Random omission of demographic information was assumed, although notably, use of nitrofurans was not equally distributed between those patients with and without demographics, accounting for 4.1% of claims with demographic information and 11.0% of claims without.

Data from Alpine county were not available for analysis according to Health Insurance Portability and Accountability Act guidelines, since the number of Medi-Cal beneficiaries in that county was not sufficiently large to allow for statistical de-identification.[37]

Total Systemic Antibacterial Prescribing Rates

The number of systemic antibacterial claims identified and included for analysis was 10,018,066. Total systemic antibacterial use in the Medi-Cal fee-for-service program decreased steadily over the 6-year study period ($r = -0.971$, $p = 0.0012$; τ-b $= -1.00$, $p = 0.009$). The rate of antibacterial prescribing was 461 antibacterial claims/1000 beneficiaries in 2011, which was nearly 15% lower than that observed in 2006 (542 antibacterial claims/ 1000 beneficiaries).

Fee-for-service beneficiaries aged < 18 years had 573 systemic antibacterial claims per 1000 beneficiaries in 2010, slightly more than that observed for the 19–64-year-old beneficiaries (556 per 1000 beneficiaries). Both of these groups were associated with substantially higher rates than observed in the > 65-year-old group (104 claims per 1000 beneficiaries). The association between prescribing rates and age was significant (χ^2 (2) = 320,000, $p < 0.001$), even when the > 65-year-old group was excluded from analysis (χ^2 (1) = 300, $p < 0.001$).

Significant variation was observed in antibacterial prescribing rates by race-ethnicity in 2011 (χ^2 (5) = 197,000, $p < 0.001$), as shown in Figure 1. Fee-for-service beneficiaries identifying themselves as Alaskan Native or American Indian had the greatest rates (1086 claims/1000 beneficiaries), followed by Caucasians (753 claims/1000 beneficiaries), Asian

Indians (470 claims/1000 beneficiaries), African-Americans (425 claims/1000 beneficiaries), Hispanics (379 claims/1000 beneficiaries), and Asian or Pacific Islander (199 claims/1000 beneficiaries).

Considerable variation in antibacterial prescribing rates was observed among counties (Figure 2). The lowest mean rate for the 6-year time period was 200.7 (95% CI 190.3–220.2) antibacterial claims per 1000 beneficiaries in Santa Barbara county, and the highest rate was 1002.3 (95% CI 1,000.4–1,004.1) in Kings county. A negative correlation was found between population density and systemic antibacterial prescribing rates ($\rho = -0.432$, 95% CI –0.454 to –0.410, $p < 0.0018$).

Broad- versus Narrow-Spectrum Antibacterial Prescribing

Broad-spectrum antibacterial use, as defined above, increased significantly each year of the study period except 2006–2007. The proportion of antibacterials that was broad-spectrum was 28.1% (95% CI 28.1–28.2%) in 2006 and 32.7% (95% CI 32.6–32.8%) in 2011.

As Figure 3 illustrates, children <5 years old consistently received a higher proportion of broad-spectrum antibacterials (mean 27.9%, 95% CI 27.8–27.9%) when compared with older children. Broad-spectrum prescribing was lowest in the 20–24-year-old age group at 23.7% (95% CI 23.6–23.8%) but increased steadily after that age, peaking at 53.4% (95% CI 52.5–54.3%) in the >90-year-old age group.

Among racial-ethnic groups, Caucasians received the greatest percentage (36.6%, 95% CI 36.6–36.7%), followed by Asian Indians (35.4%, 95% CI 35.0–35.9%), Alaskan Natives and American Indians (34.3%, 95% CI 34.0–34.6%), Asians and Pacific Islanders (31.2, 95% CI 31.1–31.4%), African-Americans (29.9%, 95% CI 29.8–30.0%), and Hispanics (27.6%, 95% CI 27.6–27.7%).

The proportion of broad-spectrum prescribing by county ranged from 18.5% (95% CI 18.4–18.6%) in Napa county to 44.6% (95% CI 44.5–44.6%) in Trinity county. A negative correlation between population density and the proportion of broad-spectrum antibacterial prescribing was observed ($\rho = -0.398$, 95% CI –0.429 to –0.367, $p < 0.001$).

Composition of Antibacterial Prescribing

Penicillins were the most frequently prescribed antibacterials, accounting for 41.2% (95% CI 41.2–41.2%) of the major antibacterial classes, followed by macrolides (17.4%, 95% CI 17.4–17.5%), cephalosporins (15.4%, 95% CI 15.4–15.4%), sulfonamides (11.9%, 95% CI 11.9–12.0%), quinolones (9.2%, 95% CI 9.2–9.2%), and tetracyclines (4.8%, 95% CI 4.8–4.8%).

As shown in Table 2, the proportion of penicillins decreased from 42.3% (95% CI 42.3–42.4%) to 38.4% (38.4–38.5%) over the study period, and the proportion of macrolides increased from 16.5% (95% CI 16.4–16.5%) to 20.5% (95% CI 20.4–20.5%). Proportions of other classes changed ≤2%.

Individual agents within each major antibacterial class are also detailed in Table 2. Amoxicillin, azithromycin, cephalexin, doxycycline, and sulfamethoxazole/trimethoprim were the most frequently used agents in their respective classes. Over the 6-year study period, the proportion of levofloxacin decreased and the proportion of ciprofloxacin increased to approximately half of the quinolone class.

The change in prescribing rates per 1000 fee-for-service beneficiaries for each major antibacterial class over the study period is shown in Figure 4. Significant downward trends were noted for cephalosporins ($r = -0.9970$, $p < 0.001$), penicillins ($r = -0.9573$, $p = 0.003$), quinolones ($r = -0.9880$, $p < 0.001$), and tetracyclines ($r = -0.9706$, $p = 0.0013$).

More than half of pediatric antibacterial prescriptions were penicillins (53.8%, 95% CI 53.8–53.9%). In contrast, less than a third of prescriptions for patients >65 years old involved penicillins (27.5%, 95% CI 27.3–27.6%). Quinolones accounted for only 1.0% (95% CI 1.0–1.0%) of pediatric prescriptions but accounted for 14.1% (95% CI 14.1–14.2%) of adult prescriptions and 26.6% (95% CI 26.4–26.7%) of seniors' prescriptions. Tetracyclines accounted for 2.1% (95% CI 2.1–2.1%) of pediatric antibacterials, 6.6% (95% CI 6.6–6.7%) of adults' antibacterials, and 4.2% (95% CI 4.1–4.2%) of seniors' antibacterials.

Discussion

The Centers for Disease Dynamics, Economics, and Policy (CDDEP) estimates the national average to be 801 antibacterial prescriptions/1000 patients; California's average is 554 prescriptions/1000 patients.[13] Our results in the Medi-Cal fee-for-service cohort with 505 prescriptions/1000 beneficiaries are consistent with these findings.

The CDDEP reported a 17% reduction in antibacterial use between 1999 and 2010.[13] Similarly, total systemic antibacterial prescribing rates in our cohort decreased nearly 15% from 2006 to 2011.

The reduction in total antibacterial use over the past decade, both nationally and in the Medi-Cal fee-for-service system, may partially be explained by the Centers for Disease Control and Prevention campaign, Get Smart: Know When Antibiotics Work, launched in 2003.[10] Within California, the Alliance Working for Antibiotic Resistance Education, a statewide collaboration of >80 organizations, has worked since 2000 toward the same goal.[38]

Consistent with other studies, we found antibacterial prescribing rates to be highest for children and lower for adults.[11–12, 15] However, the magnitude of the difference between those < and > 65 years old in our study was unusual, possibly because patients >65 years old generally receive prescription benefits through Medicare Part D rather than the Medi-Cal fee-for-service system.

The observed variation in antibacterial prescribing rates between racial-ethnic groups is likely multifactorial. Despite efforts by Get Smart: Know When Antibiotics Work,[10] AWARE,[39] and other organizations to increase cultural competency, persisting differences in patient expectations,[16, 18, 40] levels of nonprescription antibacterial use,[17–18] and language barriers to patient education[18, 40] may partially explain this finding. We acknowledge the possibility of age and other demographic factors as confounding our analysis. In addition, bias may have been introduced by our exclusion of beneficiaries who did not identify their ethnicity or listed it as “other.” Although our granular analysis does not provide additional insight to the observed differences, it hopefully will result in future studies toward clarification of these reasons.

Substantial inter-county variability was observed. Our finding of a significant negative correlation between antibacterial use and population density contrasts with the findings of others.[14] As described above, confounders are possibly responsible; however, real differences in prescribing between more and less populated areas of California are plausible and worth investigating. Future analyses evaluating variation in individual prescribers, proximity to medical centers, and other geographic variables would be worthwhile. The negative correlation between population density and broad-spectrum antibacterial use is consistent with the correlation between population density and antibacterial prescribing rates. Previous studies have also suggested a link between increased antibacterial prescribing and broad-spectrum antibacterial prescribing.[9]

The average proportion of broad-spectrum antibacterial prescribing over the study period was ~ 30%, substantially lower than the ~50% previously described.[9, 15] Notably, one of these previous studies was performed in a pediatric population; consequently, the fact that our study population included more children than seniors does not account for this discrepancy. Our findings are not entirely surprising, given that patients without health insurance or with public insurance or health maintenance organization membership are less likely than those with private health insurance to receive broad-spectrum antibacterials.[9, 14] In general, broad-spectrum antibacterials are newer and more expensive by acquisition cost compared with narrow-spectrum agents.[12, 41–42] Consequently, decreased broad-spectrum antibacterial prescribing may reflect the impact of cost, as well as increased adherence to national guidelines. Although less expensive narrow-spectrum antibacterials may ironically translate to better care, the disparity in prescribing among different racial-ethnic groups is of concern and warrants investigation. These findings also may represent an area for improved antibacterial stewardship and outpatient care.

The proportion of broad-spectrum antibacterial prescribing in the Medi-Cal fee-for-service system, although lower than the national average, did increase a small amount over the study period. This finding is consistent with other studies confirming increasing proportions of broad-spectrum antibacterial prescribing concurrent with decreasing overall antibacterial use.[11, 13, 43] Our findings suggest that the increased proportion of broad-spectrum antibacterials was a function of decreased overall use rather than increased broad-spectrum prescribing; there was no significant trend in the absolute number of broad-spectrum antibacterials during the study period.

The CDDEP reports that the proportion of penicillins used nationally decreased from 36% to 31%.[13] The proportion of cephalosporins decreased from 18% to 14% between 1999 and 2010, whereas the proportion of macrolides increased from 22% to 27% and fluoroquinolones from 9% to 12%.[13] Similar patterns were seen in our study, with the exception of decreased quinolone use over the study period. When compared with national averages, penicillins accounted for a larger (40%) and macrolides a smaller (< 20%) proportion. Given that macrolides have been implicated as an important risk factor for penicillin and multidrug resistance in the outpatient setting,[2, 44] this finding suggests good antibacterial stewardship within the Medi-Cal fee-for-service system. Supporting this idea, amoxicillin was the most frequently prescribed antibacterial agent every year, whereas nationally, as of 2010, it was azithromycin.[45] Of note, however, azithromycin represented the greatest percentage of macrolide use, increasing from 68% of the class in 2006 to 90% in 2011.

A few events may have influenced the composition of antibacterial prescribing during the study period. First, the 2004 American Academy of Pediatrics/American Academy of Family Physicians guideline designated amoxicillin the first-line antibacterial for nonsevere acute otitis media infections.[46] Second, the 2010 Infectious Diseases Society of America guideline update for acute uncomplicated cystitis recommended against fluoroquinolones and deemphasized use of the previous standard of care, sulfonamides.[47] Finally, the significant rise during the 2000s of skin and soft tissue infections (SSTIs) caused by community-acquired methicillin-resistant, rather than methicillin-sensitive, *Staphylococcus aureus* may have contributed to the observed decrease in β-lactam use.[48] Contrasting influences on sulfonamide use in the uncomplicated cystitis update and the shift in SSTI etiology may help explain the relatively constant use of sulfonamides over the study period.

There are several limitations to this study. Less than 8% of claims did not have information regarding age and race-ethnicity. It was assumed these omissions were random, but if not random, bias exists in the demographic descriptions. Also, this study assumes that the rate of antibacterial claims is equal to the rate of antibacterial prescribing and to true patient antibacterial exposure. However, even for confirmed bacterial infection, patients do not always purchase or take the antibacterials they are prescribed.[5, 49] Antibacterials obtained by patients through free antibiotic programs did not appear in the Medi-Cal claims database. In addition, we were unable to capture antibacterial exposure from nonprescription antibacterial use, which could have particularly introduced bias into our findings among racial-ethnic groups, for reasons as discussed above.[17–18] Finally, a more meaningful interpretation of the appropriateness of changes in antibacterial use would be possible if the indications for the antibacterials were available.

A major advantage to our study, however, is its review of all claims in the Medi-Cal fee-for-service system during the study period; consequently, it avoids some of the limitations associated with random sampling.

Conclusion

This study provides a high-level overview of antibacterial use in the Medi-Cal fee-for-service system. Findings include discrepancies in antibacterial prescribing rates among racial-ethnic groups as well as Medi-Cal’s lower than national average rate in both overall and broad-spectrum antibacterial prescribing rates; reasons for these findings are needed.

Antibacterial resistance is a growing problem, and unnecessary antibacterial use is an identifiable contributor. Surveillance of antibacterial use in the Medi-Cal system is an important step toward curbing excessive and inappropriate antibacterial use.

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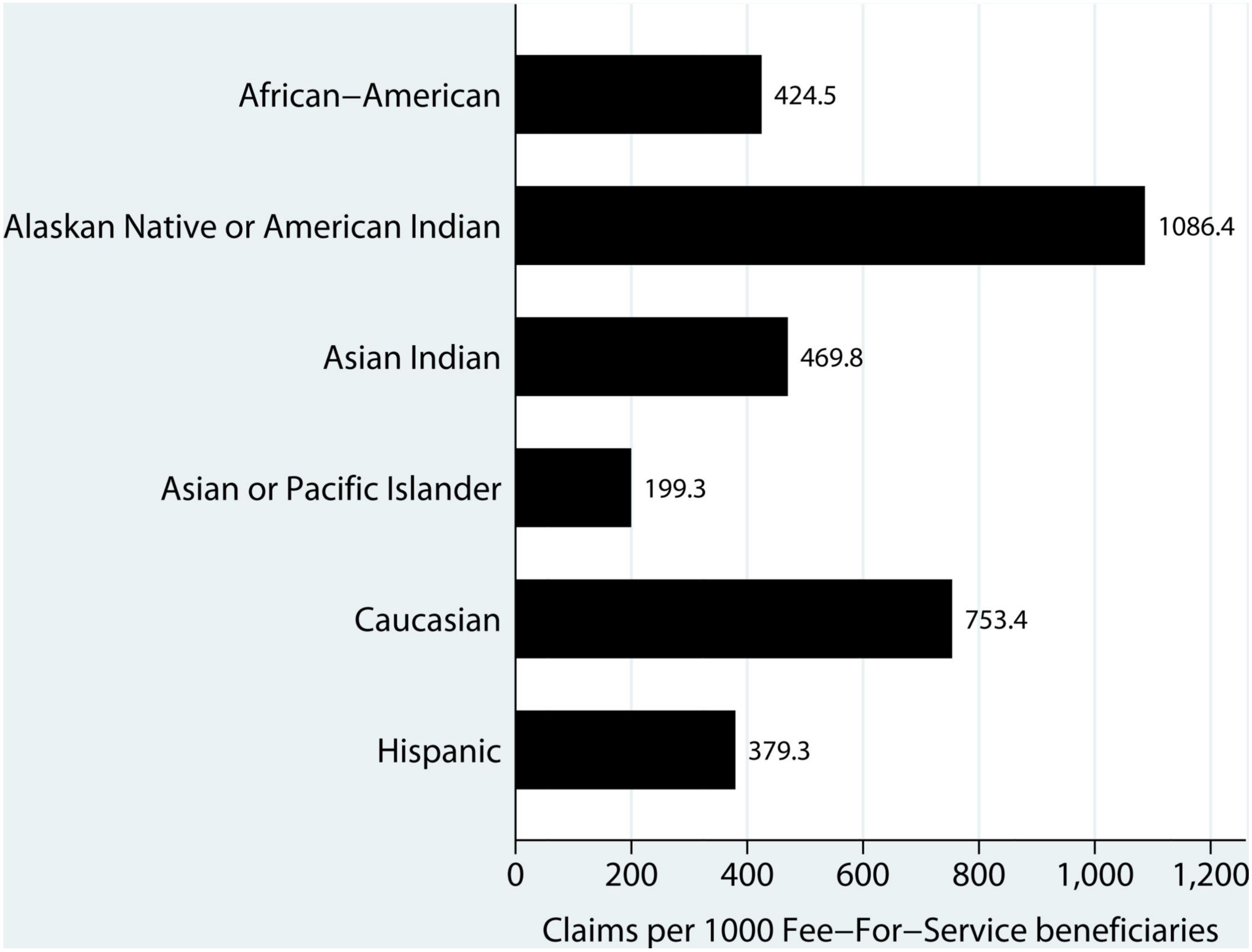

Figure 1.

Total systemic antibacterial claims/1000 fee-for-service beneficiaries by race-ethnicity. Data are from 2011.

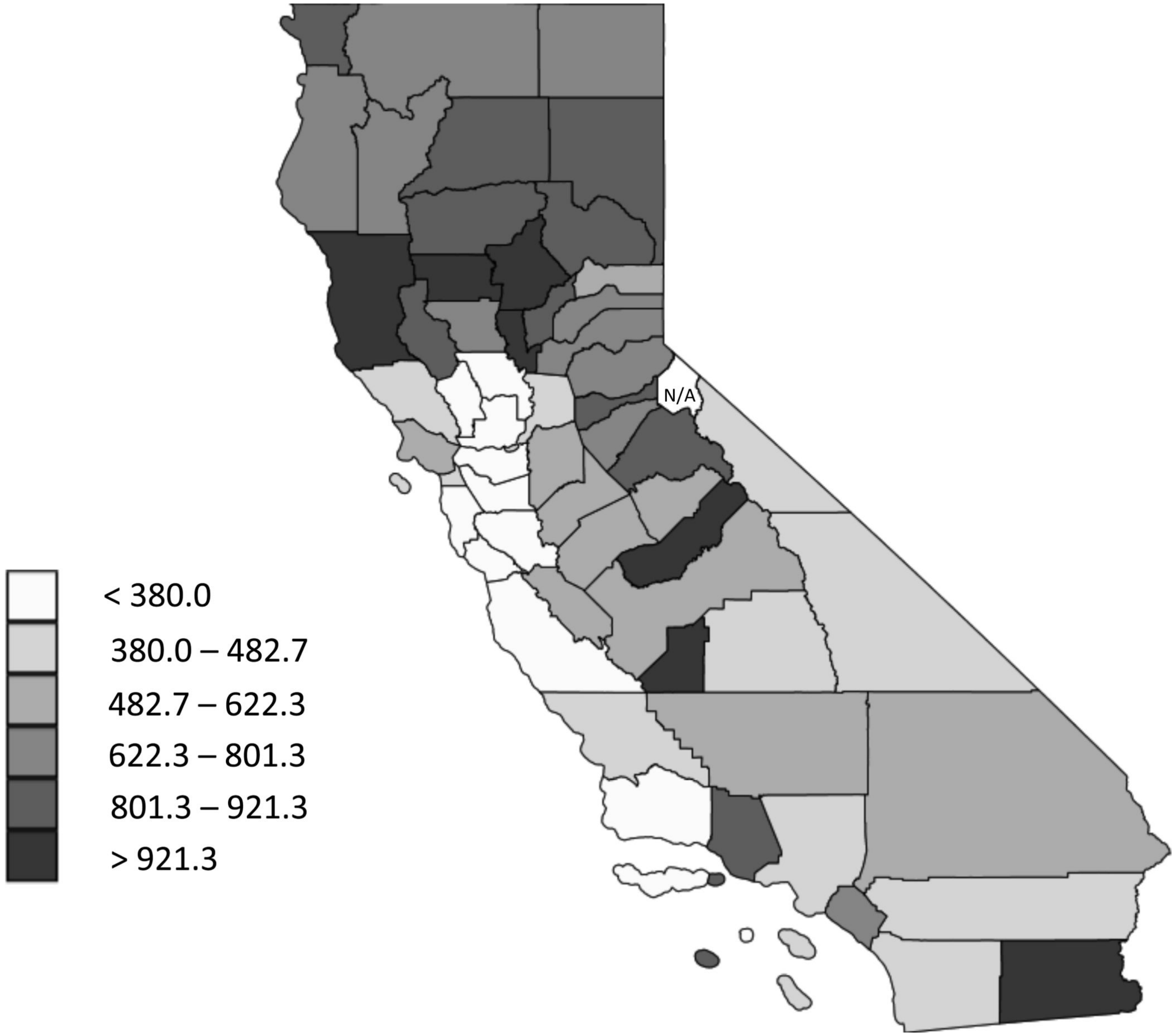

Figure 2.
Mean systemic antibacterial claims/1000 fee-for-service beneficiaries by county in California (Alpine county excluded).

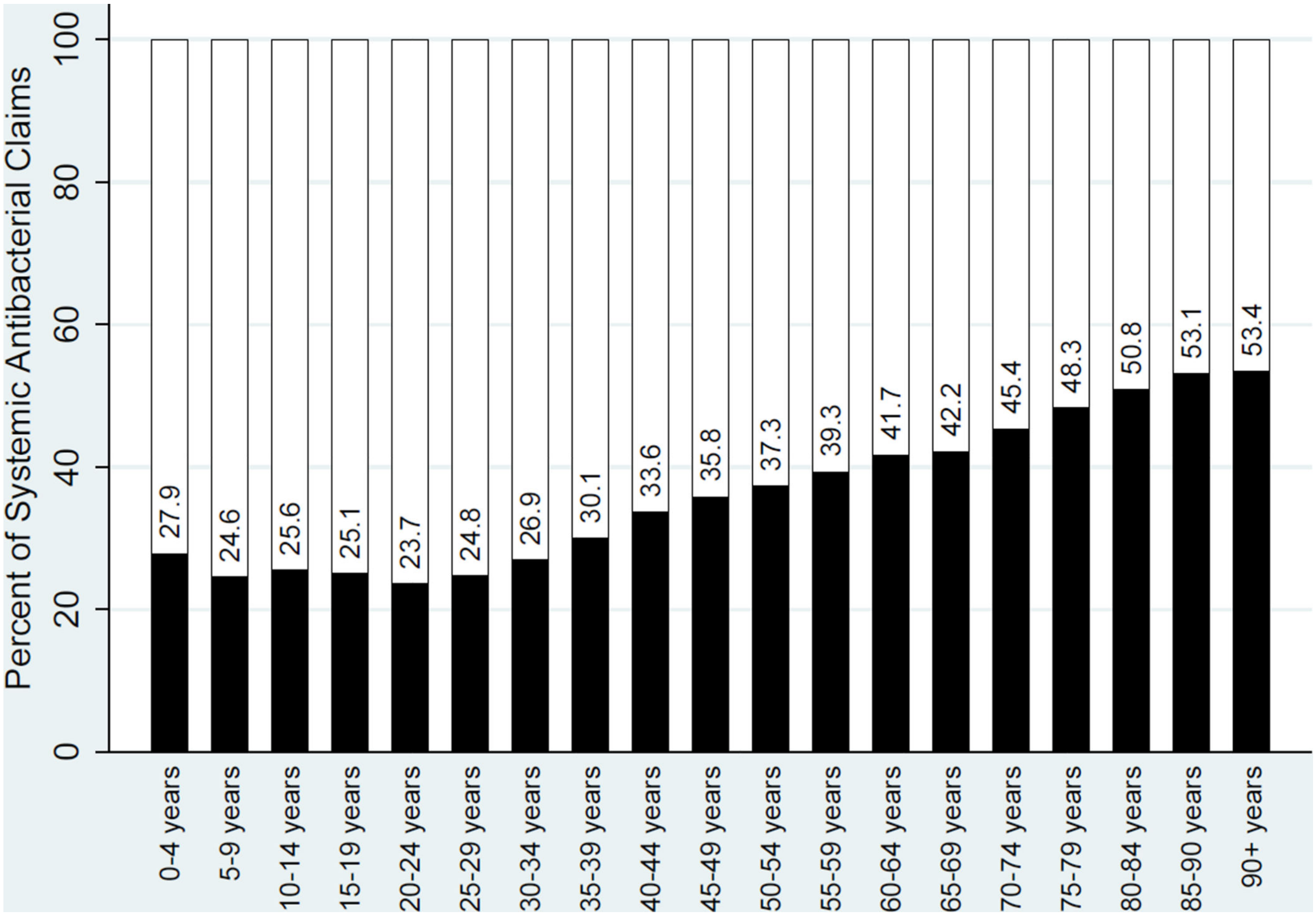

Figure 3.
Mean proportion of broad-spectrum (black bars) and narrow-spectrum (white bars) antibacterials prescribed in each age group. Age groups are shown in 5-year increments.

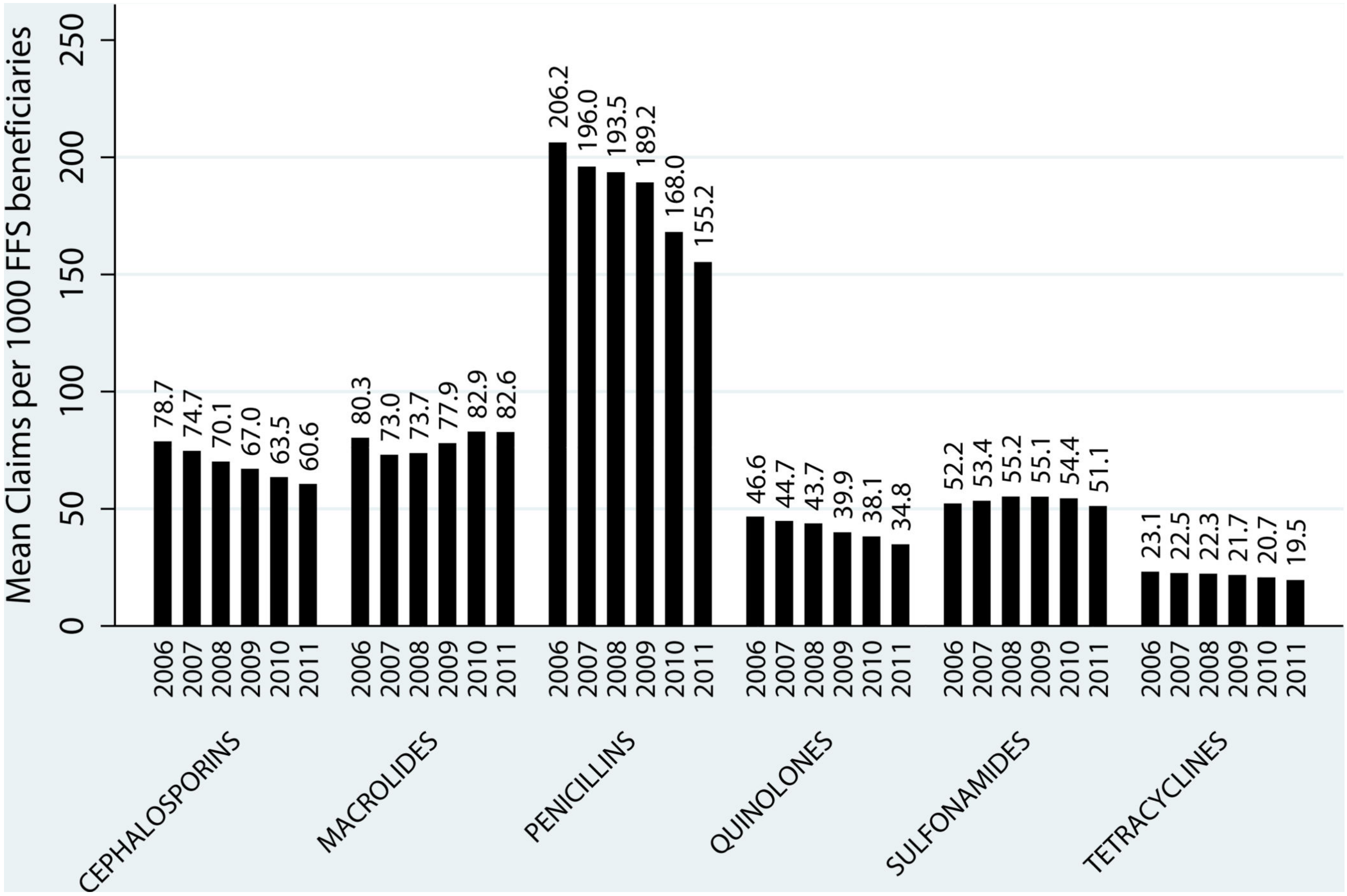

Figure 4.

Claims/1000 fee-for-service beneficiaries by antibacterial class, 2006–2011. FFS = fee-for-service.

Table 1

Narrow- and Broad-Spectrum Antibacterial Groupings

Narrow-Spectrum Antibacterials	Broad-Spectrum Antibacterials
Amoxicillin	Azithromycin
Ampicillin	Clarithromycin
Cephalosporins (first generation)	Quinolones
Dicloxacillin	Amoxicillin-clavulanate
Penicillin	Cephalosporins (second and third generation)
Metronidazole	Clindamycin
Erythromycin	Ketolides
Nitrofurans	Linezolid
Tetracyclines	
Sulfonamides	

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Table 2

Composition of Total Antibacterials Prescribed and Distribution of Individual Antibacterial Agents Within Major Antibacterial Classes in 2006 and 2011

Year	**2006**	**2011**	**Year**	**2006**	**2011**
Class	**% of total antibacterials prescribed (95% CI)**	**% of total antibacterials prescribed (95% CI)**	**Subgroup**	**% of class (95% CI)**	**% of class (95% CI)**
Penicillins	42.3 (42.3–42.4)	38.4 (38.4–38.5)	**Amoxicillin**	72.7 (72.6–72.8)	73.0 (72.9–73.2)
			Amoxicillin-clavulanate	12.7 (12.6–12.8)	15.7 (15.6–15.8)
			Penicillin	10.6 (10.6–10.7)	8.7 (8.7–8.8)
			Ampicillin	3.0 (3.0–3.1)	1.8 (1.8–1.9)
			Other	1.0 (0.9–1.0)	0.8 (0.7–0.8)
Macrolides	16.5 (16.4–16.5)	20.5 (20.4–20.5)	**Azithromycin**	68.0 (67.8–68.2)	89.6 (89.4–89.7)
			Erythromycin	23.2 (23.0–23.4)	6.6 (6.6–6.8)
			Clarithromycin	8.8 (8.6–8.9)	3.8 (3.7–3.9)
Cephalosporins	16.2 (16.1–16.2)	15.0 (14.9–15.1)	**Cephalexin**	90.0 (89.9–90.1)	96.0 (95.9–96.1)
			Cefdinir	6.5 (6.4–6.6)	0.6 (5.7–6.4)
			Ceftriaxone	2.1 (2.0–2.1)	1.9 (1.8–1.9)
			Other	1.5 (1.5–1.6)	1.5 (1.5–1.6)
Quinolones	9.6 (9.5–9.6)	8.6 (8.6–8.7)	**Levofloxacin**	61.2 (60.9–61.4)	45.0 (44.7–45.3)
			Ciprofloxacin	32.1 (31.8–32.3)	50.5 (50.2–50.8)
			Moxifloxacin	6.0 (5.8–6.1)	4.1 (4.0–4.2)

Year	2006	2011	Year	2006	2011
Class	**% of total antibacterials prescribed (95% CI)**	**% of total antibacterials prescribed (95% CI)**	**Subgroup**	**% of class (95% CI)**	**% of class (95% CI)**
			Other	0.8 (0.8–0.9)	0.4 (0.4–0.5)
Tetracyclines	4.7 (4.7–4.8)	4.8 (4.8–4.9)	**Doxycycline**	78.3 (78.0–78.6)	85.8 (85.5–86.1)
			Tetracycline	20.3 (20.0–20.6)	12.5 (12.2–12.8)
			Other	1.4 (1.3–1.5)	1.7 (1.6–1.8)
Sulfonamides	10.7 (10.7–10.8)	12.7 (12.6–12.7)	**Sulfamethoxazole-trimethoprim**	96.5 (96.4–96.5)	96.6 (96.5–96.7)
			Other	3.5 (3.5–3.6)	3.4 (3.3–3.5)