Presentation Type:
Poster Presentation - Oral Presentation
Subject Category: Antibiotic Stewardship
Private practice dentists improve antibiotic use after dental antibiotic stewardship from infectious diseases experts
Debra Goff; Julie Mangino; Elizabeth Trolli and Douglas Goff

Background: Dentists prescribe ~25.7 million antibiotic prescriptions annually. Private practice dentists (PPDs) represent 80% of US dentists who need to implement dental antimicrobial stewardship. We conducted a prospective cohort study of PPDs comparing appropriateness of antibiotic use before and after dental AS education. **Methods:** PPDs were invited to participate in this study. In phase 1 (pre-education), we collected 3 months (June–August 2019) of retrospective antibiotic use data (indication, dose, duration, penicillin allergy history) and number of dental procedures. We also conducted a preliminary survey to assess baseline antimicrobial stewardship knowledge. In phase 2 (education), PPDs attended 4 televideo education sessions (March–May 2021) taught by an infectious disease– antimicrobial stewardship (ID-AS) pharmacist and physician. In phase 3 (posteducation), we prospectively collected 3 months (June–August 2021) of antibiotic use data (as in phase 1), using an online database with ongoing feedback. In phase 4, we conducted antibiotic use audit and feedback to PPDs after the survey, and we solicited recommendations to reach more PPDs. The Student *t* test was used for statistical analyses. **Results:** Study participants comprised 15 PPDs: 2 oral maxillofacial surgeons, 6 periodontists, 4 endodontists, and 3 general dentists. Among them, 10 had been in practice >20 years. The presurvey revealed that 14 were unfamiliar with dental antimicrobial stewardship. All prescribed clindamycin (25% for nonpenicillin allergy), and standard antibiotic duration ranged from 5 to 14 days based on dental school training. In phase 3, despite more procedures, overall antibiotic use and duration decreased, and the use of clindamycin, quinolones, and prophylaxis for joint implant patients, also decreased. Appropriate use improved from 22% to 95%. Postsurvey responses on perceived value of antimicrobial stewardship education were 100% positive, with recommendations to make antimicrobial stewardship a required annual continuing education, similar to opioid continuing education. Study participants invited the ID-AS experts to teach an additional 150 PPDs to date via established PPD study clubs to expand dental antimicrobial stewardship across the United States. **Conclusions:** After learning dental antimicrobial stewardship guidance from ID-AS experts, PPDs rapidly optimized antibiotic prescribing behavior. PPDs identified their established study clubs as a forum to quickly expand dental antimicrobial stewardship training by ID-AS experts throughout the United States.
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Table 1.

Outcomes	Pre	Post	P value
Dental procedures (#)	8,526	9,063	
Antibiotic prescriptions (#)	2,124	1,903	<0.0001
Appropriate use (%)	22%	95%	<0.0001
Prophylaxis for infective endocarditis (#)	28	32	0.079
Prophylaxis for Joint implant (#)	163	72	<0.0001
Duration (therapeutic only) Mean days	7.7	5.1	<0.0001
Antibiotic prescriptions (#)			
Clindamycin	183	18	<0.0001
Quinolones	26	5	<0.0001
Amoxicillin	1320	1286	0.02
Azithromycin	86	234	<0.0001
Doxycycline	67	62	0.48

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Metrics in outpatient stewardship: Is more always better?
Natalia Medvedeva; David Ha; Sharon Onguti; Emily Rosen; Emily Mui; Sean Pearce; Alex Schneider; Amy Chang; Adam Hersh; Eddie Stenehjem and Marisa Holubar

Background: Emerging evidence supports the use of billing data to identify stewardship targets in primary care. Standardizing an approach to antibiotic prescribing rate (APR) calculations could facilitate external benchmarking. **Methods:** Using methodology and an ICD-10 dictionary validated in urgent care clinics,[1] we created an expanded ICD-10 dictionary to incorporate additional ICD-10 codes from primary care associated with antibiotic prescriptions (Fig. 1). We then compared antibiotic prescribing rates using the urgent care and expanded dictionaries. We included all primary care visits from 2019 to 2020 and extracted ICD-10 codes and antibiotic order data. Using the urgent care and expanded ICD-10 dictionary, we classified each encounter by prescribing tier based on whether antibiotics are almost always (tier 1), sometimes (tier 2), or almost never (tier 3) indicated. For encounters with ICD-10s in multiple tiers, we chose the lowest tier. For multiple ICD-10 codes within the same tier, we chose the first extracted ICD-10 code. We calculated antibiotic prescribing rates as the proportion of encounters associated with ≥ 1 antibacterial prescription. This quality improvement project was deemed non–human subjects research by the Stanford Panel on Human Subjects in Medical Research. **Results:** The urgent care dictionary has 1,400 ICD-10 codes. We added 1,439 ICD-10 codes derived from primary care encounters to create the expanded ICD-10 dictionary (8.5% tier 1, 9.1% tier 2, and 82.4% tier 3) (Fig. 1). We identified 177,531 encounters; 74% had ≥ 2 associated ICD-10 codes (Fig. 2). In total, 147,085 encounters (82.9%) were classified into a tier using the urgent care dictionary. An additional 22,039 encounters were classified with the expanded dictionary (Table 1). Most added encounters were tier 3 with low 0.7% APR (Tables 1 and 3). In total, 41,473 (28.2%) encounters were classified differently depending on the ICD-10 dictionary used, most commonly changing from tier 3 to tier 2 without an increase in overall tier 2 antibiotic prescribing rate (Tables 2 and 3). Overall antibiotic prescribing rates were similar when using either the urgent care or expanded ICD-10 dictionary (Table 2). **Conclusions:** The expanded ICD-10 dictionary allowed for classification of more encounters in primary care; however, it did not meaningfully change antibiotic prescribing rates. Antibiotic prescribing rates were likely diluted by classifying more encounters without identifying an associated increase in

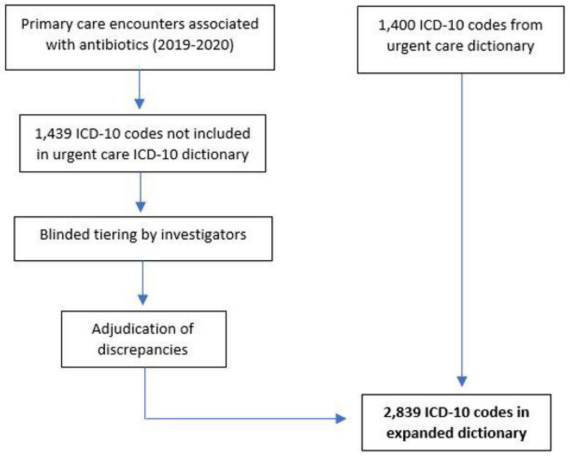

Figure 1: Methodology for Creating the Expanded ICD-10 Dictionary

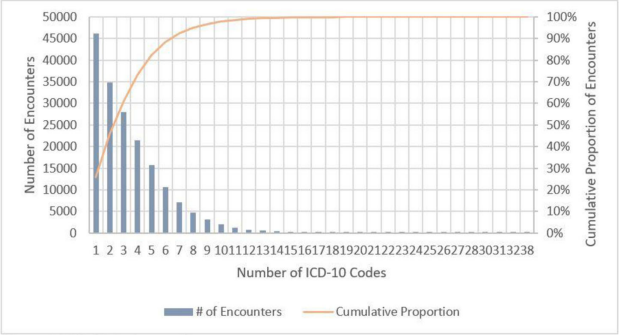

Figure 2: ICD-10 Codes per Encounter

Table 1: Classification of Encounters

	Urgent Care ICD-10 Dictionary	Expanded ICD-10 Dictionary
Included ICD-10s (No.)	1,400	2,839
Encounters classified (No., %)	147,085/177,531 (**82.9%**)	169,124/177,531 (**95.3%**)
Tier (No., %)		
1	3,418 (**2.3%**)	4,121 (**2.4%**)
2	11,348 (**7.7%**)	18,377 (**10.9%**)
3	132,319 (**90.0%**)	146,626 (**86.7%**)

Table 2: Antibiotic Prescribing Rate (APR) of Classified Encounters

	Urgent Care ICD-10 Dictionary	Expanded ICD-10 Dictionary
Overall APR	5,347/147,085 (**3.6%**)	5,741/169,124 (**3.4%**)
2019	2,981/74,512 (**4.0%**)	3,228/84,826 (**3.8%**)
2020	2,366/72,573 (**3.3%**)	2,513/84,298 (**3.0%**)
APR by Tier		
1	1,513/3,418 (**44.3%**)	1,664/4,121 (**40.4%**)
2	2,012/11,348 (**17.7%**)	2,539/18,377 (**13.8%**)
3	1,822/132,319 (**1.4%**)	1,538/146,626 (**1.0%**)

Table 3: Impact of Expanded Dictionary: Antibiotic Prescribing Rate (APR) of Additionally Categorized and Re-Categorized Encounters

		APR (%)
Additionally categorized encounters (no.)	22,039	1.8%
Tier 1	162 (0.7%)	15.4%
Tier 2	1,260 (5.7%)	17.9%
Tier 3	20,617 (93.5%)	0.7%
Re-categorized encounters (no.)	41,473	1.9%
Change in Tier	6,538 (15.8%)	8.7%
Tier 2 -> 1	190 (2.9%)	47.4%
Tier 3 ->1	351 (5.4%)	10.3%
Tier 3 -> 2	5,988 (91.6%)	6.6%

antibiotic prescribing. A more sophisticated classification system may help to accommodate the diversity and volume of ICD-10 codes used in primary care.

1. Stenehjem E, et al. *Clin Infect Dis* 2020;70:1781–1787.

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Evaluation of periprocedure antibiotics and infection-related hospitalizations after transrectal prostate biopsies

Tenley Ryan; Neena Thomas-Gosain; Jane Eason; Hanna Akalu; Navila Sharif and Jessica Bennett

Background: Prostate cancer is the leading cancer diagnosis and the second leading cause of cancer deaths in men. Definitive diagnosis is made by prostate biopsy. This procedure poses a risk of infection and, rarely, sepsis. Studies have found the incidence of symptomatic urinary tract infection (UTI) after biopsy to be 2%–3%, and the rate of infection-related hospitalization (IRH) to be 0.6%–4.1%. An initial review at our facility found the IRH rate to be 3.7%. The primary purpose of this study was to determine the incidence of IRH following prostate biopsy in patients at the Memphis VA Medical Center (VAMC) after initial review and education. **Methods:** All transrectal prostate biopsies performed at the Memphis VAMC from October 2017 through May 2021 were analyzed. Patients were excluded if they had a spinal cord injury or concomitant procedure. The primary outcome was IRH occurring within 30 days of the procedure. Variables collected included risk factors, antibiotic choice and duration, and details of postprocedural infections. Analyses were performed on a per-procedure basis. **Results:** Overall, 601 procedures were identified; 13 were excluded, for a total of 588 transrectal prostate biopsies on 533 patients. All patients were given antibiotics. Oral antibiotics alone were provided for 306 procedures (52%) for an average duration of 3 days. A combination of both oral and intramuscular antibiotics were provided for 282 (48%) procedures. The most common oral antibiotics used were cefuroxime (538, 91.4%), ciprofloxacin (17, 2.9%), amoxicillin–clavulanate (16, 2.7%), and sulfamethoxazole–trimethoprim (12, 2%). Intramuscular antibiotics included ceftriaxone (263, 93.3%) and gentamicin (19, 6.7%). An infectious complication occurred in 29 patients (4.9%): 26 (3.4%) were urogenital and 5 (0.8%) required hospitalization. Of the procedures complicated by a postprocedure infection, 22 (75.9%) received an oral antibiotic alone, 21 (95.4%) of which were cefuroxime, and 7 (24.1%) received both an intramuscular and an oral agent. **Conclusions:** In our initial review, the most common antibiotics used were fluroquinolones, with an average duration of 3 days periprocedure and an IRH rate of 3.7%. These findings were used to reinforce practices compliant with American Urological Association (AUA) guidelines. This follow-up review reveals that the first-line choice changed from fluroquinolones to cephalosporins, with average duration remaining at 3 days. Although the overall infection rate was 4.9%, the IRH rate decreased from 3.7% to 0.8%.

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Rates of intravenous antibiotic starts among outpatient hemodialysis patients using NHSN dialysis event reporting, 2016–2020

William Wilson; Sarah Kabbani; Shannon Novosad; Lucy Fike; Katryna Gouin; Jeneita Bell; Suparna Bagchi; Jonathan Edwards; Ibironke Apata and Susan Cali

Background: Nearly one-third of patients on hemodialysis receive intravenous (IV) antibiotics annually, but national data characterizing antibiotic use in this population are limited. Using NHSN surveillance data for outpatient dialysis facilities, we estimated temporal changes in the rate of IV antibiotic starts (IVAS) among hemodialysis patients as well as the proportion of IVAS that were not supported by a reported clinical indication. **Methods:** IVAS events were obtained from the NHSN Dialysis Event module between 2016 and 2020, excluding patients who were out of network, receiving peritoneal or home dialysis, or with unspecified vascular access. IVAS unsupported by documentation were defined as new IVAS without a collected or positive blood culture, pus, redness or swelling event, or an associated clinical symptom. Pooled mean rates of total and unsupported IVAS were estimated per 100 patient months yearly and stratified by vascular access type. Differences in IVAS rates by year were estimated with negative binomial regression. **Results:** Between 2016 and 2020, 7,278 facilities reported 648,410 IVAS events; 161,317 (25%) were unsupported by documentation (Table 1). In 2016, 3,340 (54%) facilities with ≥1 IVAS event reported an IVAS unsupported by documentation, which increased to 4,994 (73%) in 2020. Total IVAS rates decreased by an average of 8.2% annually (95% CI, 7.1%–9.3%; $P < .001$). The average annual percentage