Original Contributions

Dentists' prescribing of antibiotics and opioids to Medicare Part D beneficiaries
Medications of high impact to public health

Laura Koppen, PharmD; Katie J. Suda, PharmD, MS; Susan Rowan, DDS;
Jessina McGregor, PhD; Charlesnika T. Evans, MPH, PhD

ABSTRACT

Background. Gaining a better understanding of dental prescribing can help identify opportunities for intervention regarding optimal medication use. The purpose of this study is to characterize opioid and antibiotic prescribing patterns of dentists in the United States for Medicare Part D beneficiaries.

Methods. The authors conducted a retrospective cross-sectional analysis of national 2014 Medicare Part D Prescriber Public Use File data. Providers in the data set with dental-related disciplines were included (n = 99,797). Outcomes of interest were mean days' supply and mean number of claims reported per claim, beneficiary, and prescriber discipline.

Results. Of the 6,724,372 dental prescription claims submitted, 3,947,848 (58.7%) and 1,312,796 (19.5%) were for antibiotics and opioids, respectively. Sixty-nine percent of dentists in the highest quartile of opioid prescribers were also in the highest quartile of antibiotic prescribers ($r^2 = 0.7778$; $P < .01$). The mean (standard deviation) days' supply per claim was 6.9 (5.3) days (range, 1-90 days) for antibiotics and 3.6 (2.0) days (range, 1-44.5 days) for opioids. Of the 33,348 dental providers who prescribed opioids, 18,971 (56.9%) prescribed a mean opioid days per claim greater than the recommended duration of 3 days for acute pain.

Conclusion. Opioids and antibiotics are the medications most prescribed by dentists. On the basis of national recommendations and results of studies from other countries, the length of therapy prescribed may be excessive. Further studies should be conducted to assess appropriateness of dental prescriptions.

Practical Implications. Dentistry should be considered for antibiotic and opioid stewardship interventions along with medicine.

Key Words. Antibiotics; opioids; dentistry; treatment; prophylaxis.

Inappropriate medication use affects patient-level outcomes, but it can also affect public health. Decreasing excessive and inappropriate use of antibiotics may help decrease the incidence of infections caused by antibiotic-resistant organisms and *Clostridium difficile*, both of which are associated with patient morbidity and mortality.[1-5] Reduction of inappropriate antibiotic use has been repeatedly identified as a target for limiting the spread of antimicrobial resistance, which is an internationally recognized public health threat. Across the United States, dentists prescribe 10.4% of all outpatient antibiotics, making them the top antibiotic prescribers after primary care physicians.[6]

Another medication class with growing public health concerns is opioids; high rates of opioid prescribing have been linked to the growing opioid abuse epidemic in the United States.[7,8] Dentists prescribe 6.4% of all outpatient opioid prescriptions in the United States.[9,10] Dentists are more likely to prescribe opioids than primary care physicians, and areas with a higher number of dentists per capita are associated with increased rates for opioid prescribing.[9,11]

As part of the efforts to curb antibiotic resistance, a National Action Plan on Combating Antibiotic-Resistant Bacteria provides strategies to decrease patient harm while preserving patient access to antibiotics[12]; similarly, a National Action Plan on Adverse Drug Event Prevention was

published with the aim of preventing harm from opioid misuse and overdose while preserving access for patients.[13] In addition, guidelines for prescribing antibiotics for prophylaxis and opioids for pain were updated. In most patients, the use of antibiotic prophylaxis for prevention of infective endocarditis and prosthetic joint infection is no longer recommended.[14-16] Although not specific to oral pain, the Centers for Disease Control and Prevention (CDC) opioid prescribing guidelines recommend 3 days or fewer for the treatment of acute pain, noting that more than 7 days of therapy is rarely necessary.[17,18]

Gaining a better understanding of dental prescribing practices can help identify opportunities for intervention and education regarding inappropriate prescribing within the dental setting. Dental prescribing habits for Medicare beneficiaries in the United States have not been examined. Thus, the purpose of our study is to characterize the opioid and antibiotic prescribing patterns of dentists in the United States for Medicare Part D beneficiaries. In addition, variability in prescribing will be assessed by dental discipline and geographic area.

METHODS

Study design, setting, and sample

A retrospective cross-sectional analysis of national Medicare Part D Prescriber Public Use File (PUF) data from calendar year 2014 was conducted. The PUF is a publically available data set maintained by the Centers for Medicare & Medicaid Services. The Part D Prescriber PUF includes claims data from all beneficiaries enrolled in the Medicare Part D program (primarily patients older than 65 years). Providers in the PUF data set with disciplines designated as dentist, maxillofacial surgery, oral surgery, or oral and maxillofacial surgery were eligible for inclusion into the study. Data in the PUF were aggregated and organized into records; each record contains the claims data for 1 drug from 1 prescriber, so each prescriber has multiple records in the PUF (1 for each distinct drug prescribed). Prescribers are included in the PUF if they have a valid National Provider Identifier and were included on Medicare Part D prescription drug events submitted by the Part D plan sponsors. Providers with fewer than 11 prescription claims submitted in 2014 are not included in the PUF data set; thus, they are not included in the study.[19] Furthermore, records with fewer than 11 claims (that is, medications that were prescribed fewer than 11 times by that particular prescriber) are not included in the PUF data set.

Data collection

The Medicare Part D PUF data set was used to obtain characteristics of the providers (National Provider Identifier, provider discipline, state, total number of beneficiaries, total claim count for all drugs prescribed) and characteristics of the medication records (name of drug dispensed, number of distinct Part D beneficiaries who received the drug, total number of claims for the drug [including refills], and total days' supply of medication dispensed). Because beneficiary numbers are redacted when the number of beneficiaries for that medication record is fewer than 11, the exact number of beneficiaries was not provided for some medications for select providers. To overcome this limitation, the number of beneficiaries was imputed as 10 for any provider who did not have a value for number of beneficiaries. The number 10 was chosen to provide the most conservative estimate for the number of claims per beneficiary and the days' supply dispensed per beneficiary.

Outcome variables

Medication claims were aggregated by drug class as defined by the American Hospital Formulary Service Drug Information classification system and categorizations by the Centers for Medicare & Medicaid Services. Nonsystemic antibacterial drugs (for example, topical formulations) were included in the total number of prescription claims, but they were excluded from all further analyses of antibiotics as a class. Opioids were categorized as long-acting or immediate release, based on US Food and Drug Administration classification; all opioids included in the extended-release, long-acting opioid Risk Evaluation and Mitigation Strategies program were classified as long-acting, and all other opioids were classified as immediate release.[20] Outcomes of interest for both antibiotics and opioids were days' supply dispensed per claim, number of claims per beneficiary, days' supply dispensed per beneficiary, and number of claims per 100 beneficiaries by state for opioids and antibiotics.