Opioid Prescribing Patterns Among Otolaryngologists: Crucial Insights Among the Medicare Population

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Objectives/Hypothesis: There has been growing recognition of the roles prescription drug misuse and diversion play in facilitating the ongoing opioid epidemic. Our objective was to evaluate opioid prescription patterns among practicing otolaryngologists.

Study Design: Retrospective review of a CMS database.

Methods: Medicare Part D beneficiary data (2015) were accessed for a list of otolaryngologists. Opioid prescription rates, amount, and supply were calculated. Factors including board certification, experience, gender, and location were obtained for the 9,068 unique otolaryngologists represented in this dataset.

Results: In 2015, otolaryngologists wrote 133,779 opioid prescriptions for 922,806 days (6.9 days/per prescription). The majority was for hydrocodone-acetaminophen (64.0%). Most otolaryngologists (51.2%) prescribed ≤ 10 opioids; 6.1% offered > 50 opioid prescriptions. Men wrote more prescriptions on average. Opioid prescription rates were greatest in the Midwest (4.6%) and least in the Northeast (1.8%), and the highest/lowest rates were in Delaware (8.6%) and New York (1.3%). Midcareer (11–20 years) otolaryngologists were most likely to write > 50 prescriptions. The opioid prescription rate declined with greater experience.

Conclusions: Opioid prescribers written by otolaryngologists may play a significant role in the availability of these agents, as otolaryngologists wrote nearly 1 million days worth of opioids to Medicare beneficiaries in 2015. Although the majority of otolaryngologists write fewer than 11 prescriptions annually, those writing more prescriptions also write lengthier courses. There is significant geographic variation in prescribing patterns, highlighting a lack of consensus, and midcareer otolaryngologists are more aggressive in offering opioids. These findings highlight an urgent need for strengthening educational resources aimed at minimizing unnecessary prescriptions.

Key Words: Opioids, analgesia, opioid epidemic, perioperative analgesia, pain.

Level of Evidence: NA.

INTRODUCTION

According to the Centers for Disease Control and Prevention (CDC), nearly half of 33,000 opioid-related deaths in 2015 were due to prescription drug overdoses, making it the deadliest year on record at the time. Although recent years have been characterized by increasing recognition of the drastic toll prescription drug abuse takes upon individuals, families, and our healthcare system, opioid-related substance abuse and overdose has been rising over the past two decades, largely as a result of more aggressive prescribing patterns. From 1999 to 2014, there was a fourfold increase in opioid prescriptions; this phenomenon stemmed less from increases in pain disorders (which remained stable) and largely from evolving societal trends, ranging from an increasing variety of available opioids to the treatment of pain as “the fifth vital sign.”

The opioid “epidemic” has been increasingly recognized in recent years, both from the personal toll it has taken on many individuals and the prominent role it has played in political campaigns. Consequently, there has been increased interest in this topic from the perspectives of patients, physicians, and policymakers. Interestingly, specialty-specific considerations for perioperative employment of opioids are not incorporated in otolaryngology training curricula, a deficit that has been noted in other specialties as well. The current analysis aimed to evaluate opioid prescription patterns among practicing otolaryngologists, employing an extensive Centers for Medicare and Medicaid Services (CMS) dataset encompassing physicians treating Medicare patients. Our objectives included delineating overall otolaryngology opioid prescription burden...
among this patient population as well as demographic patterns associated with opioid prescription.

MATERIALS AND METHODS

Medicare Part D prescriber information was obtained from a publicly available dataset administered by the CMS.10 Signed into law by George W. Bush as part of the Medicare Modernization Act, this prescription drug benefit went into effect in 2006 and currently provides prescription coverage for >40 million beneficiaries,11 making it the largest payor for this purpose in the United States. Prescription data for the most recent year available, 2015, were obtained. Data collection was completed November 2017 by authors P.F.S., K.A., E.G., and E.F. Data were filtered to obtain information about prescriptions offered by otolaryngologists. For individual drugs per each physician for which there are ≥10 prescriptions written, CMS does not make prescribing information public to preserve privacy. Thus, practitioners who prescribed ≥10 prescriptions for a particular opioid did not have specific prescription numbers specified in our analysis. CMS makes available prescription data for each medication prescribed >10 times by an individual.

The initial dataset of all medications prescribed by otolaryngologists encompassed 93,460 entries (one entry per medication per individual). These entries were each examined by the authors for whether the medication noted was an opioid, the number of opioid prescriptions provided, the number of total prescriptions provided, and the total number of days supply for opioid medications. After analyzing this information, there were noted to be 9,068 different otolaryngologists represented within these data. In addition to the parameters described above, several demographic factors were collected for each of these otolaryngologists, including location of practice (organized by state and US census bureau designated region) and gender. Gender was determined using names and online profiles as previously described in several other analyses examining demographic patterns among otolaryngologists.12–15 Additionally, board certification status and primary certification year for each otolaryngologist were determined using the American Board of Otolaryngology’s online verification system, with the latter parameter employed to determine years of experience.

Statistical Analysis

For comparison of continuous and categorical variables, t tests and χ² analyses were used, respectively, with threshold for significance set at P < .05. SPSS version 20 (IBM, Armonk, NY) was used for statistical calculations.

RESULTS

There were 93,360 separate prescription entries encompassing 9,068 otolaryngologists. Of these 9,068 otolaryngologists, 7,970 (87.9%) were board certified, possessing 17 median years of experience (18.5 mean). In 2015, these otolaryngologists wrote 133,779 prescriptions for opioid medications out of a total of 3,753,005 total prescriptions (3.6% of prescriptions). These opioid prescriptions covered a supply of 922,806 days as reported by CMS, coming out to 6.9 days per opioid prescription. There were 7,698 men (84.9%) and 1,370 female (15.1%) otolaryngologists. A plurality of physicians practiced in the South (36.5%), followed by the Midwest (21.3%), West (21.3%), Northeast (18.9%), and other territories (2.0%).

Opioids Prescribed

Out of 133,779 opioid prescriptions written by otolaryngologists, most were for hydrocodone-acetaminophen (85,607 prescriptions, 64.0% of opioid prescriptions) (Fig. 1). Other popular opioids included oxycodone-acetaminophen (14.8%) and acetaminophen-codeine (11.5%). Opioids representing <1% of prescriptions included tramadol-acetaminophen (0.46%), hydromorphone (0.24%), morphine (0.23%), fentanyl (0.2%), and oxycodone (0.15%). An opioid conversion chart that describes the opioids prescribed by otolaryngologists in this analysis is illustrated in Table I.

Opioid Prescription Patterns

In 2015, the majority of otolaryngologists (51.2%) prescribed opioids in ≤10 instances (Table II), whereas only 6.1% offered >50 prescriptions. Otolaryngologists writing for a greater amount of opioid prescriptions also prescribed lengthier courses (Table II). Otolaryngologists writing for 10 or fewer opioid prescriptions had the greatest mean experience (20.0 years, P < .05), whereas
those writing >50 prescriptions had more experience than those writing at midranges (Table II).

Gender Prescription Patterns
Men wrote a greater number of prescriptions than women (median 11 vs. ≤10). Upon consideration only of otolaryngologists who wrote >10 prescriptions (i.e., those with specific claims numbers reported for opioids), men wrote a greater mean number of prescriptions (30.9 vs. 24.6 opioid prescriptions, *P* < .05) (Table III). At the extremes, a significantly greater proportion of women wrote <11 prescriptions (63.2% vs. 49.1%, *P* < .05), whereas a greater proportion of men wrote >50 prescriptions (7.0% vs. 2.6%, *P* < .05). Women wrote lengthier opioid prescriptions (7.3 days vs. 6.9 days, *P* < .05).

Geographic Trends
A plurality of opioid prescription was in the South (62,984), followed by the Midwest, West, and Northeast (Table IV). The proportion of total prescriptions that were for opioids was greatest in the Midwest (4.6%) and least in the Northeast (1.8%) (Table IV) (*P* values < .05). Prescribers in the Midwest prescribed shorter courses than those in other regions. At the state level, the greatest opioid prescription rate (opioid prescriptions per total prescriptions) was in Delaware (8.6%) and Minnesota (7.0%) and the lowest rate was in New York (1.3%) and New Jersey (1.5%) (Fig. 2).

### DISCUSSION
Organizations such as the CDC have issued evidence-based recommendations for the management of chronic pain. Nonetheless, misuse of medications prescribed for chronic pain represents only one facet of prescription diversion that has contributed to the US opioid epidemic. Medications intended for acute and perioperative analgesia also contribute to the availability of prescription drugs, although there has been little analysis evaluating the extent to which otolaryngologic procedures contribute to societal trends. A recent analysis exploring the use of hydrocodone-acetaminophen following rhinoplasty noted that patients use only a fraction of pills prescribed, allowing an opportunity for significant diversion and suggesting otolaryngologists reevaluate how many pills they prescribe.

The present analysis is the first to analyze otolaryngologists’ prescribing patterns from a national perspective, suggesting significant potential consequences from even a modest level of diversion. In only 1 year, otolaryngologists wrote 133,779 prescriptions encompassing 922,806 days of supply; diversion of only a small portion of these prescriptions would lead to millions of unaccounted pills. It is important to consider these data in light of inherent limitations; although the largest single payer of prescription drug coverage (>40 million

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose (PO Unless Specified)</th>
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<tbody>
<tr>
<td>Morphine</td>
<td>30 mg</td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>30 mg</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>20 mg</td>
</tr>
<tr>
<td>Codeine</td>
<td>200 mg</td>
</tr>
<tr>
<td>Fentanyl*</td>
<td>12.5 μg/hr</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>7.5 mg</td>
</tr>
<tr>
<td>Oxymorphone</td>
<td>10 mg</td>
</tr>
</tbody>
</table>

*Variability exists for description of opioid equivalency depending on sources.

*Fentanyl transdermal patch PO morphine equivalents per 24 hours*.

**TABLE II.** Gender Differences in Opioid Prescribing Patterns.

<table>
<thead>
<tr>
<th></th>
<th>No. of Claims*</th>
<th>No. &lt; 11</th>
<th>No. &gt; 50</th>
<th>Days per Claim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>7,698</td>
<td>30.9</td>
<td>49.1%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Women</td>
<td>1,370</td>
<td>24.6</td>
<td>63.2%</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

*Average represents mean among individuals for whom the number of opioid prescriptions was reported (i.e., among individuals who wrote >10 opioid prescriptions).
adults), Medicare Part D only covers a portion of the population.

Although hydrocodone-acetaminophen prescriptions comprised most prescriptions (64.0%) (Fig. 1), there were nearly 500,000 other opioids prescribed by otolaryngologists, making critical an understanding of these agents’ differences (Table I). Inadequate opioid education has been identified as a deficit in graduate medical education. A recent survey of 248 surgical residency program directors reported that less than a third of training programs mandate opioid prescribing education despite nearly all programs allowing trainee prescription of opioids on an outpatient basis.9 Among most programs offering such education, the time dedicated was only an hour. Strengthening the amount and quality of educational resources aimed at appropriate opioid prescription may be an important consideration for minimizing the unnecessary prescription and subsequent misuse of these medications.18–20

Another finding highlighting a lack of consensus was significant geographic discrepancy (Fig. 2). Although differences in prescription length were minimal to modest (Table IV), further regional variation was noted among opioid prescription rates. These differences were even more apparent upon evaluation of state-by-state trends. Geographic differences in the utilization of diagnostics and interventions have been previously demonstrated for topics relevant to otolaryngologists.21–23 This lack of consensus as relating to opioids is meaningful when considered in the context of contemporary trends, as two million individuals in the United States meet the criteria for substance abuse disorder stemming from the use of prescription drugs.24

Midcareer otolaryngologists (11–20 years of experience) were more aggressive with opioid prescription than those at other stages of their careers. This cohort had the greatest proportion writing >50 prescriptions (8.7%) and the lowest proportion writing 10 or fewer prescriptions (Table V). Furthermore, both midcareer otolaryngologists as well as those with 0 to 10 years of experience had the greatest opioid prescription rates (3.9% and 4.4%, respectively), whereas those at later career stages had modest opioid prescription rates (3.2% and 2.7% for those with 21–30 and >30 years experience). There are several potential explanations for these
findings. Traditionally, physicians have avoided prescription of opioids due to the fear of facilitating dependence and abuse. During the past 2 to 3 decades, management of pain as a fifth vital sign has emerged, particularly among patients with chronic pain, and historical barriers to opioid prescription have been diminished, with medical education curricula and large hospital systems (including the Veterans Administration) adopting this campaign and emphasizing appropriate treatment of pain. Importantly, the cohort of otolaryngologists with 11 to 20 years of experience was in training during the emergence of this campaign.

Another notable finding relates to the prescription lengths offered by otolaryngologists. Interestingly, those writing a greater amount of prescriptions tended to write lengthier prescriptions (Table II). There is no definitive consensus delineating appropriate opioid prescription lengths for perioperative analgesia, although various states have recently passed legislation aimed at regulating prescription courses. Several Northeastern states have passed legislation regulating prescriptions for acute pain. For example, in 2017, New Jersey passed legislation limiting prescriptions to a 5-day supply.25,26 Although New York and New Jersey have the most restrictive laws, these states already had the lowest opioid prescription rates among otolaryngologists (1.3% and 1.5% in this analysis) (Fig. 2) using 2015 data; unless these trends are far different for other specialties, it is not clear whether these laws may significantly impact trends, particularly because they are focused on acute pain. In this analysis, otolaryngologists prescribed 6.9 days of supply per opioid prescription, already within or close to many of the more restrictive guidelines. Unless prescription patterns for perioperative analgesia differ tremendously compared to other specialties, numerous potential strategies may need to be considered for addressing the opioid crisis from the policymaking level, including a greater focus on chronic pain or further educational emphasis on analgesia. These considerations are beyond the scope of this analysis and represent valuable areas of future study.

To our knowledge, this is the first nationwide analysis evaluating opioid prescribing patterns among otolaryngologists. Nevertheless, there are several limitations inherent to our study design that merit consideration. Comparison to nonopioid analgesics would not be possible using this resource, as many physicians may suggest patients use over the counter medications such as nonsteroidal anti-inflammatory drugs; although prescriptions can be written for these over-the-counter medications, a significant proportion of these patients likely obtain these over the counter, and many physicians may not write specific prescriptions for these medications for this reason. Hence, any comparison with nonopioid analgesics available over the counter would have been fraught with uncertainty. Comparison with alternatives represents something better delineated through an institutional retrospective (or prospective) analysis or via a survey-based study design. Another limitation is that CMS only offers information regarding opioid prescriptions for those who prescribed >10 prescriptions; otolaryngologists on the list of physicians in the CMS Medicare Part D database with no opioid data thus wrote for 10 or fewer opioid prescriptions, and these data can be accounted for in the context of examining the median amount of prescriptions. There is no information linking specific prescriptions to patients and indications, although the working assumption is that a significant proportion of these prescriptions likely stems from perioperative and acute pain management with the exception of patients with head and neck cancer. Although certainly varying by institution, patients requiring long-term chronic pain management in the authors’ institutions are largely referred to pain medicine practitioners, although this is certainly one consideration to keep in mind in reviewing these data for the entire country.

Another important limitation relates to this dataset being restricted to Medicare Part D Beneficiaries, the vast majority of whom are over the age of 65 years. As these data are restricted to older patients, and many physicians are usually more cautious in opioid prescription to the elderly, the extent to which opioid prescription is detailed here is probably understated when compared to trends across all ages; however, it may not be reliable to extrapolate these data to non-Medicare beneficiaries. Nonetheless, Medicare Part D serves >40 million beneficiaries,11 making it the largest single payer of prescription coverage and thus the largest available dataset to the authors’ knowledge. Hence, we believe these data provide valuable insights and play an important role in understanding practices that need to be clarified within our specialty. For example, there are disparate geographic patterns, reinforcing a lack of consensus, as well as notable demographic patterns (particularly by experience) that may point to the impact of

### TABLE V.

Opioid Prescription Patterns by Experience.

<table>
<thead>
<tr>
<th>Years of Experience</th>
<th>No.</th>
<th>&lt;11 Scripts</th>
<th>&gt;50 Scripts</th>
<th>Median No. of Scripts</th>
<th>Length, Days</th>
<th>Opioid Rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–10</td>
<td>2,442</td>
<td>49.9%</td>
<td>4.1%</td>
<td>20</td>
<td>6.2</td>
<td>4.4%</td>
</tr>
<tr>
<td>11–20</td>
<td>2,218</td>
<td>42.8%</td>
<td>8.7%</td>
<td>21</td>
<td>6.3</td>
<td>3.9%</td>
</tr>
<tr>
<td>21–30</td>
<td>1,831</td>
<td>50.7%</td>
<td>6.9%</td>
<td>22</td>
<td>6.4</td>
<td>3.2%</td>
</tr>
<tr>
<td>&gt;30</td>
<td>1,476</td>
<td>67.0%</td>
<td>4.5%</td>
<td>21</td>
<td>10.4</td>
<td>2.7%</td>
</tr>
<tr>
<td>Not board certified</td>
<td>1,101</td>
<td>50.4%</td>
<td>6.0%</td>
<td>22</td>
<td>8.1</td>
<td>3.7%</td>
</tr>
</tbody>
</table>

*Opioid rate is the proportion of opioid prescriptions.
prior public policy and educational paradigms. One last limitation that should be emphasized is that there was no individual patient data linked to these prescriptions, so it is unclear what proportion of patients prescribed opioids by otolaryngologists already had longstanding pain issues that would have added to their analgesic requirements as opposed to which individuals received prescriptions for acute postoperative pain. Hence, there was no way to tell how many surgical procedures were performed on these patients necessitating prescription of opioids, and this represents one consideration for future study better evaluated via a multi-institutional analysis.

CONCLUSION

There has been growing recognition of the role prescription drug misuse and diversion play in the ongoing opioid epidemic. Opioid prescriptions written by otolaryngologists may play a significant role, as practitioners wrote nearly 1 million days of opioids to Medicare beneficiaries in 2015. Although the majority of otolaryngologists write fewer than 11 prescriptions annually, those writing more prescriptions tend to write lengthier courses; nonetheless, the average prescription lengths fall near or within the most restrictive laws encompassing acute pain management. There is significant geographic variation, highlighting a lack of consensus, and midcareer otolaryngologists are more aggressive about writing opioid prescriptions. These findings highlight an urgent need for strengthening the quality of educational resources aimed at appropriate perioperative analgesia in our specialty, as this may be an important consideration for minimizing unnecessary prescriptions and subsequent misuse of these medications.

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