The present opioid use epidemic has garnered significant attention. Over the last 16 years, more than 183,000 Americans have died from overdose related to prescription opioid use.1,2

The epidemic has set off ripples among policymakers. The US Food and Drug Administration has launched the Opioid Policy Steering Committee to explore and develop strategies to confront the crisis. The committee looks to answer, among other things, whether physicians are informed adequately regarding prescribing recommendations and whether clinicians are prescribing the appropriate number of doses for a given medical indication.

Most people who eventually become addicted to opioids are first exposed through prescription medications.3 Efforts to combat the current situation are now being focused on the pharmaceutical industry supplying the medications and physicians who are doing the prescribing. We set forth to understand better the opioid prescribing habits of ophthalmologists and seek to better elucidate our role in the prescription opioid abuse epidemic.

Methods

The Centers for Medicare and Medicaid Services’ Medicare Provider Utilization and Payment Data were accessed to gather the data for analysis, starting in June 2017. Specifically, we analyzed Medicare Part D Prescriber data4 for 2013 to 2015 (the only...
years in which data are available). The Part D Prescriber Public Use File provides data on drugs prescribed by physicians and other health care professionals paid for under the Medicare Part D Prescription Drug Program.

The prescriber type was limited to individual ophthalmologists with valid National Provider Identifier numbers practicing in the United States. The data set matched physicians’ National Provider Identifier numbers and the specific prescriptions dispensed at their direction. Data were collected and analyzed regarding the individual prescribing patterns for opioid drugs (number of prescriptions written including refills, number of days’ supply, and prescriber rate). The number of prescriptions for each physician is reported if no prescriptions are written or more than 10 are written for the calendar year. All physicians prescribing 1 to 10 opioid prescriptions during a calendar year are grouped together without providing individual-level prescribing data. This is a measure from the Centers for Medicare and Medicaid Services to protect privacy. To include in the analysis those physicians for which individual-level data were not available (eg, those prescribing between 1 to 10 opioid prescriptions), we estimated 5 prescriptions written annually.

The study was deemed exempt by the institutional review board at Vanderbilt University Medical Center because this was a quality improvement study. Informed consent was not necessary because all data were publicly available and de-identified. The Public Use File was downloaded and organized into Microsoft Excel (Microsoft Corp). Data analysis and figure construction was performed using GraphPad Prism (GraphPad Software). Mean, median, and range calculations were performed for all quantitative variables.

Results

Number of Ophthalmologists

The Medicare Part D prescriber Public Use Files for 2013, 2014, and 2015 included 19,615, 19,587, and 19,712 ophthalmologists, respectively. Age and race/ethnicity data were unavailable. In 2013, 4,167 of 19,615 ophthalmologists were women (21.2%).

Number of Opioid Prescriptions

The mean number of opioid prescriptions including refills written by ophthalmologists did not change over the 3-year study period (Table 1). In 2013, 95,898 prescriptions were written by ophthalmologists writing more than 10 opioid prescriptions, compared with 90,534 opioid prescriptions in 2015. The number of ophthalmologists prescribing more than 10 opioid prescriptions was tabulated from the data files. We then used these numbers to calculate the number of prescriptions written per prescriber. For this subset, 41 to 44 opioid prescriptions were written per ophthalmologist per year during the 3-year study period. The median number of days’ supply that opioid prescriptions were written for was 5. In this subgroup of ophthalmologists, opioid prescriptions represented 8% (mean) of their total prescriptions written annually. The median prescriber rate was 4%, implying the mean was skewed higher by certain prolific opioid prescribers.

No individual prescribing data were given for ophthalmologists writing 1 to 10 opioid prescriptions in a given year. If we assume that these prescribers wrote 5 prescriptions a year on average, the number of opioid prescriptions written per ophthalmologist decreases to 7 per year.

Ophthalmologists’ Prescribing Patterns

Ophthalmologists were separated into 4 categories based on the number of opioid prescriptions written per year: none, 1 to 10, 11 to 100, and more than 100 (Table 2). This was then compared with the total number of prescribing ophthalmologists for the year. During the 3 years, 52,312 of 58,914 ophthalmologists (88.8%) wrote 10 prescriptions or fewer per year. In total, 6,023 (10.2%) wrote 11 to 100 opioid prescriptions annually. Each year, approximately 1.0% of ophthalmologists wrote more than 100 opioid prescriptions.

Table 1. Number of Opioid Prescriptions Written by Ophthalmologists From 2013 to 2015

<table>
<thead>
<tr>
<th>Variable</th>
<th>Ophthalmologists Writing &gt;10 Opioid Prescriptions</th>
<th>Extrapolating for All Ophthalmologists*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total opioid prescriptions, No.</td>
<td>95,898</td>
<td>93,483</td>
</tr>
<tr>
<td>Total ophthalmologists, No.</td>
<td>2,340</td>
<td>2,180</td>
</tr>
<tr>
<td>Prescriptions written per ophthalmologist, No.</td>
<td>41</td>
<td>43</td>
</tr>
<tr>
<td>Mean time opioids supplied, d</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Median prescriber rate, %</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Mean prescriber rate, %</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Abbreviation: NA, not available.

* Assuming 5 prescriptions written annually for ophthalmologists where individual-level data were not available.

Key Points

Question What are the trends in opioid prescribing among ophthalmologists?

Findings In this observational cohort study, we analyzed Medicare Part D Prescription Drug Program beneficiaries from 2013 to 2015 and found that 88% to 89% of ophthalmologists wrote 10 opioid prescriptions or fewer annually. Southern states in the United States tended to have a higher number of prescriptions written per physician.

Meaning These results suggest ophthalmologists in general prescribe opioids responsibly; the current prescription opioid epidemic should prompt physicians to consider revisiting their opioid prescribing protocols.

Table 2. Ophthalmologists’ Prescribing Patterns by Number of Opioid Prescriptions From 2013 to 2015

<table>
<thead>
<tr>
<th>Variable</th>
<th>2013</th>
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</tbody>
</table>

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Table 2. Opioid Prescribing Patterns Categorized by Number of Prescriptions Written

<table>
<thead>
<tr>
<th>Prescriptions Written Annually, No.</th>
<th>Ophthalmologists, No. (%)</th>
<th>2013 (n = 19 615)</th>
<th>2014 (n = 19 587)</th>
<th>2015 (n = 19 712)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8718 (44)</td>
<td>9004 (46)</td>
<td>9599 (49)</td>
<td></td>
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<tr>
<td>1-10</td>
<td>8556 (44)</td>
<td>8403 (43)</td>
<td>8032 (41)</td>
<td></td>
</tr>
<tr>
<td>11-100</td>
<td>2150 (11)</td>
<td>1977 (10)</td>
<td>1896 (9)</td>
<td></td>
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<tr>
<td>&gt;100</td>
<td>191 (1)</td>
<td>203 (1)</td>
<td>185 (1)</td>
<td></td>
</tr>
</tbody>
</table>

(Table 2). These numbers stayed consistent between 2013 (191 of 19 615 [0.97%]), 2014 (203 of 19 587 [1.03%]), and 2015 (185 of 19 712 [0.94%]).

Geographic Disparity in Prescribing Patterns

The data available were stratified based on geographic location of the ophthalmologist. The number of opioid prescriptions written overall in the state was averaged against the number of physicians from that state in the database. The analysis was limited to ophthalmologists writing more than 10 opioid prescriptions a year. See the Figure for the geographic distribution across the United States. Oklahoma, Arkansas, Alabama, Tennessee, Georgia, and Texas consistently had the highest number of prescriptions written per physician annually. North Dakota, South Dakota, Iowa, Vermont, Alaska, and Wyoming had the lowest number of opioid prescriptions written per physician between 2013 and 2015 (Table 3).

Discussion

Drug overdoses have become the number 1 cause of mortality in American adults 50 years and younger. Policy makers are now trying to address the root cause of the opioid abuse epidemic. Although a full discussion of the causes of this crisis is beyond the scope of this article, the heavy emphasis on pain control, along with the misuse of prescription opioids, are implicated.5

Primary care physicians, based on sheer volume, prescribe the most opioids.6,7 However, certain specialties, such as dentistry and pain management, specifically have high opioid prescribing rates compared with overall prescriptions written. Opioid prescriptions comprised approximately 8% of prescriptions written by ophthalmologists, on average. However, accounting for outliers, the median number of opioid prescriptions compared with total prescriptions was 4%. This number is below the national mean of 6.8% among all prescribers.8 Additionally, this number is considerably lower compared with other surgical services, in which up to 37% of prescriptions written are for opioids.

Although certain surgical specialties, such as dentistry, may have high prescribing rates, the days supplied is important in mitigating abuse. Among all health care professionals for which data were available, ophthalmologists typically prescribe 5-day supplies of opioids. It is reasonable to assume that these are prescribed for the immediate postoperative period after eye surgery. Although postoperative pain control is an important consideration, there is a known link between surgery and chronic opioid use.9 One such study showed that patients receiving an opioid prescription within 7 days of ambulatory surgery (cataract surgery was 1 of the
included procedures) were 44% more likely to become long-term opioid users. Although health care professionals are trained to identify patients with signs of opioid dependency, even opioid-naive patients can be at risk for dependence after surgery.

Pain after cataract surgery is typically minimal, especially with the widespread implementation of small incision phacoemulsification. The advent of sutureless small-gauge vitrectomy has also led to a significant reduction in postoperative pain. Nonopioid pain relievers, such as acetaminophen and nonsteroidal anti-inflammatory drugs, frequently control postoperative discomfort. Although certain ophthalmic procedures may require stronger medications in the immediate postoperative period, this is certainly not the norm. Health care professionals are tasked with individualizing pain control regimens through the judicious use of opioid medications.

Our analysis demonstrates variability in prescribing patterns among ophthalmologists based on region in the United States. Southern states tended to have an increased number of opioid prescriptions written per physician. This is consistent with overall physician opioid prescribing patterns, which are disproportionately higher in southern states. Conversely, midwestern states had an overall lower number of opioid prescriptions written per physician. This analysis specifically included physicians writing more than 10 opioid prescriptions annually, as individual data were not available for those prescribing less frequently. These numbers are greatly influenced by certain outliers whose opioid prescriptions comprise 20% or more of all prescriptions written. However, our analysis shows that if all physicians are included, opioid prescribing makes up a minimal amount of overall prescriptions in ophthalmology, with a mean of 7 prescriptions written annually by each physician.

Limitations
The limits of our study relate to the database and information available. The Medicare Part D Prescriber Public Use File is derived from beneficiaries participating in the Medicare Part D prescription drug program. Physicians not participating in Medicare Part D are not included. Although this database encompasses approximately 70% of all Medicare beneficiaries, some patients were missed. Additionally, this analysis does not take into account patients with private insurance or individuals without insurance. Any aggregated data from prescribers with 10 or fewer claims are excluded from the database (a measure from the Centers for Medicare and Medicaid Services to protect patient privacy). We acknowledge that the statistics may be skewed by certain high-volume prescribers. This is especially true given the number of physicians who did not record any opioid prescriptions. Additionally, we cannot account for physicians who may be retired or no longer practicing but still listed in the Medicare Part D database.

However, despite these limitations, ophthalmologists appear to be cautious prescribers of opioids compared with their surgical peers. Consistently between 2013 to 2015, almost 90% of ophthalmologists wrote 10 or fewer opioid prescriptions annually with half of this group recording no such prescriptions. The mean supply of 5 days also shows appropriate discretion. However, even with a limited 5-day supply, up to 10% of patients can become chronic opioid users at 1 year. The evidence shows that each incremental increase in initial opioid supply leads to a dramatic increase in the risk of dependency.

Ophthalmology is a specialty in which a disproportionate amount of care is provided to patients over age 65 years. Although opioid overdose rates are highest among people aged 25 to 54 years, chronic opioid abuse among older age groups is a growing concern. This further underscores the importance of thoughtful opioid prescribing.

Conclusions
Our findings imply that ophthalmologists, as a group, tend to prescribe opioids responsibly to their patients. Advancements in ophthalmic surgery have kept opioid prescribing rates stagnant across the profession while many other surgical specialties’ rates continue to rise. However, the current epidemic highlights the substantial risk of opioid dependency even with seemingly innocuous prescribing patterns. The current state of affairs should prompt health care professionals to consider revisiting their protocols for opioid prescribing.
Conflict of Interest Disclosures: Both authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

REFERENCES