Current Problems in Cancer 45 (2021) 100655

Contents lists available at ScienceDirect

Current Problems in Cancer

journal homepage: www.elsevier.com/locate/cpcancer

Opioid prescription by gynecologic oncologists: An analysis of Medicare Part D claims

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ABSTRACT

The use of opioids across all specialties has increased greatly over the last 2 decades and along with it, opioid misuse, overdose and death. The contribution of opioids prescribed for gynecologic cancers to this problem is unknown. Data from other surgical specialties show prescriber factors including gender, geographic location, board certification, experience, and fellowship training influence opioid prescribing. To characterize national-level opioid prescription patterns among gynecologic oncologists treating Medicare beneficiaries. The Centers for Medicare and Medicaid Services database was used to access Medicare Part D opioid claims prescribed by gynecologic oncologists in 2016. Prescription and prescriber characteristics were recorded including medication type, prescription length, number of claims, and total day supply. Region of practice was determined according to the US Census Bureau Regions. Board certification data were obtained from American Board of Obstetrics and Gynecology website. Bivariate statistical analysis and linear regression modeling were performed using Stata version 14.2. In 2016, 494 board-certified US gynecologic oncologists wrote 24,716 opioid prescriptions for a total 267,824 days of treatment (median 8 [interquartile range {IQR} 6, 11] prescribed days per claim). Gynecologic oncologists had a median of 33 opioid claims (IQR 18, 64). Male physicians had significantly more opioid prescription claims than females ($P < 0.01$) including after adjustment for differences in years of experience. There was no difference in prescribed days per claim between male and female physicians. Physicians in the South had the greatest number of opi-

☆ The authors report no conflict of interest.
☆☆ This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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https://doi.org/10.1016/j.currproblcancer.2020.100655

oid prescription claims and significantly more than physicians in all other regions ($P < 0.01$). Gynecologic oncologists who were board certified for >15 years had a greater number of median opioid claims (28 IQR 16, 50) than those with <5 years since board certification (22 IQR 15, 38) ($P= 0.04$). Physicians who were board certified in palliative care (n = 19) had significantly more opioids claims (median 40; IQR 18, 91) than those without (median 32; IQR 18, 64) ($P< 0.01$). In 2016, there were gender-based, regional, and experience-related variations in opioid prescribing by providers caring for Medicare-insured patients.

ARTICLE INFO

Keywords: Center for Medicaid and Medicare Services; Gynecologic oncology; Medicare Part D; Opioid; Opioid claim; Opioid epidemic; Opioid prescription; Prescriber demographics; Palliative care

Introduction

Gynecologic oncologists prescribe opioids in a wide array of clinical settings. These may include treating acute postoperative pain, chronic pain from malignancy or complications of treatment and during end-of-life care. The use of opioids across all specialties has increased greatly over the last 2 decades and along with it, opioid misuse, overdose and death.[1] In 2016 alone, the Centers for Disease Control and Prevention reported more than 42,000 opioid-related overdose deaths, with 40% of these related to prescription opioids, the deadliest year yet.[2] Moreover, from 2004 to 2011, the Drug Abuse Warning Network reported an increase of 183% in medical emergencies related to opioid use.[1,3] Opioid misuse in the United States has thus been declared an epidemic and public health crisis.

In 2016, the American Society for Clinical Oncology issued a policy statement emphasizing the importance of opioids as a component of cancer treatment and the need to protect access for oncologic patients amidst new legislation combating opioid misuse and diversion.[4] At present, the contribution of opioids prescribed for cancer-related pain to this larger, national problem is unknown.[4,5] The current study utilizes Medicare Part D prescription data which includes coverage for over 40 million beneficiaries published by the Centers for Medicare and Medicaid Services (CMS). The purpose of this study is to characterize national-level opioid prescription patterns among gynecologic oncologists treating Medicare beneficiaries.

Methods

This study was exempt from review by the Albert Einstein College of Medicine Institutional Review Board as it did not constitute human subjects research. The CMS database was used to access publicly available Medicare Part D Prescriber Data from January 1, 2016 to December 31, 2016 (the most recent year available for data collection). The dataset was filtered to include opioid prescription claims by gynecologic oncologists who were identified using CMS specialty code. Opioid type, prescription length, number of claims, and total day supply were recorded. Claim data for physicians with less than 10 opioid claims are not reported in the CMS database to protect patient privacy and these individuals and their claims were therefore excluded from the analysis. Online faculty listings, departmental websites, and credentialing body websites were searched to identify prescriber demographics including physician gender, practice location, years since board certification, and palliative care certification. Board certification status and year of board certification in gynecologic oncology, as well as dual certification in palliative care for each physician were abstracted from the American Board of Obstetrics and Gynecology online directory. Region of practice location was identified per the US Census Bureau regions (Northeast, Midwest, South, and West).[6]

All statistical analysis was performed using Stata version 14.2 (College Station, TX: StataCorp LP). Bivariate statistical analysis including chi-squared, Fisher's exact test, Kruskal-Wallis

Table 1
Demographic and prescribing characteristics of providers analyzed using the 2016 Medicare Part D beneficiary database.

Characteristics*	Total cohort (N = 494)
Gender	
Male	301 (61)
Female	193 (39)
US region	
South	224 (45)
Midwest	97 (20)
West	91 (18)
Northeast	82 (17)
Certified in palliative care	19 (4)
Years since certification	12 (5, 21)
Beneficiary count†	27 (15, 46)
Total claims for opioid prescriptions	33 (18, 64)
Total number of days of opioid prescribed	260 (136, 596)
Total number of days of opioid per claim	8 (6, 11)

* Continuous data reported as median (interquartile range). Categorical data are presented as N (%).
† Based on 426 available observations.

test, and Wilcoxon rank-sum test were performed to compare variables with threshold for significance set at $P < 0.05$. Linear regression modeling was also performed to examine association of gender and years of experience with number of opioids prescribed.

Results

Demographics

A total of 494 board-certified gynecologic oncologists with >10 opioid claims from Medicare Part D beneficiaries in 2016 were included in this analysis. Male physicians comprised 61% of the cohort. Median number of years since board certification was 12 (interquartile range [IQR] 5, 21) years (Table 1). When stratifying by experience, 28% of physicians had 0-5 years since board certification, 32% of physicians had 6-15 years since board certification, and 39% of physicians had greater than 15 years since board certification. Males had significantly greater years in practice (median 17 years [IQR 8, 24]) compared to female providers (median 6 years [IQR 3, 13], $P < 0.01$). Only 19 (4%) of included physicians had palliative care certification, with 74% of these providers being male. For the entire cohort, 45% practiced in the South, 20% in the Midwest, 18% in the West, and 17% practiced in the Northeast.

Opioid prescription patterns by gynecologic oncologists

In 2016, the 494 gynecologic oncologists included in this cohort wrote 24,716 opioid prescriptions for 267,824 total days of treatment (median 8 [IQR 6, 11] prescribed days per claim). The most commonly prescribed opioid was hydrocodone-acetaminophen (9653 prescriptions, 39% of total opioid prescriptions). Other commonly prescribed opioids included oxycodone-acetaminophen (29%), oxycodone (13%), and tramadol (9%). Opioids that comprised <5% of total opioid prescriptions included morphine (3%), fentanyl (2%), hydromorphone (2%), codeine-acetaminophen (2%), oxymorphone (1%), and tramadol-acetaminophen (0.1%; Figure). The majority of physicians had 11-50 opioid prescription claims (67%) A minority of prescribers had >100 opioid claims (11%).

Opioid prescription patterns by gender

Male physicians had significantly more opioid prescription claims than females (median 39 [IQR 20, 72] vs 27 [16, 47] claims, $P < 0.01$). There was no difference in prescribed days per

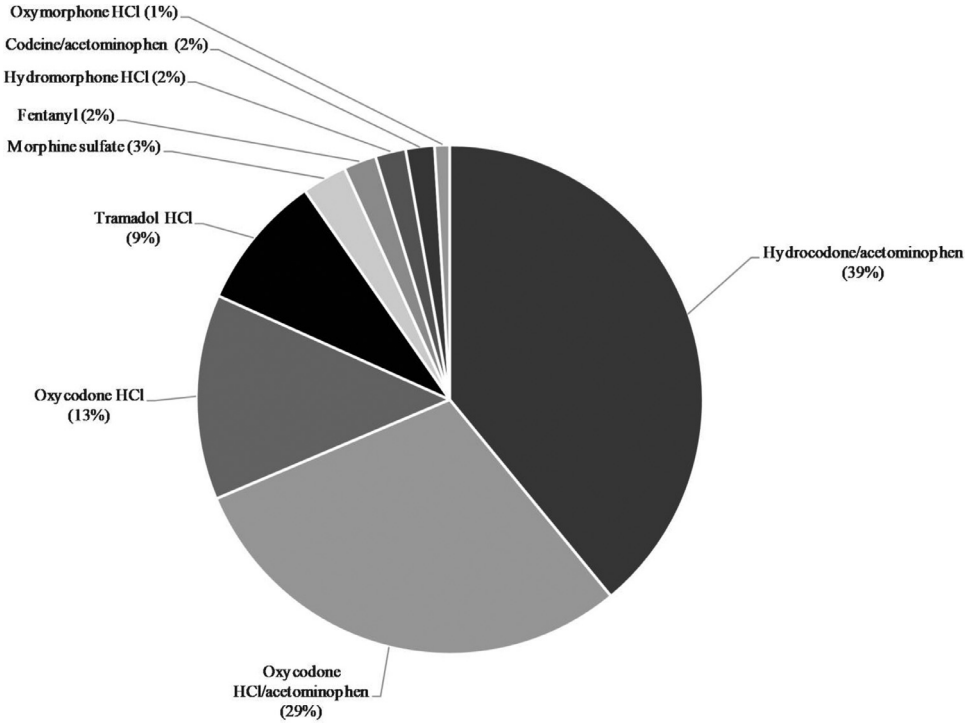

Figure. Opioids prescribed by gynecologic oncologists through Medicare Part D in 2016. Not shown: hydrocodone/ibuprofen (<1%), tramadol HCl/acetaminophen (<1%).

Table 2
Prescribing characteristics of gynecologic oncologists in the 2016 Medicare Part D beneficiary database stratified by gender.

Characteristics*	Female (N = 193)	Male (N = 301)	*P* value
Years since certification	6 (3, 13)	17 (8, 24)	<0.01
Beneficiary count†	24 (15, 39)	29 (16, 52)	<0.01
Total claims filed for opioid prescriptions	27 (16, 47)	39 (20, 72)	<0.01
Total number of days of opioid prescribed	223 (129, 447)	285 (152, 654)	<0.01
Total number of days of opioid per claim	8 (6, 12)	8 (6, 11)	0.84

* Continuous data reported as median (interquartile range). *P* values refer to the output produced by the Wilcoxon rank-sum test. A *P* value <0.05 indicates that the 2 genders differ in prescribing characteristics.
† Based on 426 available observations.

claim between male and female physicians (*P*= 0.84; Table 2). Relative to women, men were 3 times more likely to have more than 100 opioid claims filed (odds ratio 3.30, 95% confidence interval 1.62-6.71). Linear regression modeling demonstrated that after adjusting for region of practice and number of years since board certification, male providers had an average of 14 more claims for opioid prescriptions (95% confidence interval 1.7-26.7) compared with women during the 2016 year.

Opioid prescription patterns by experience

Gynecologic oncologists with board certification for >15 years wrote significantly more opioid prescriptions (median 28 IQR 16, 50) than those with <5 years of board certification (median 22 prescriptions IQR 15, 38; *P*= 0.04). With each additional year of practice as a board

Table 3
Prescribing characteristics of gynecologic oncologists in the 2016 Medicare Part D beneficiary database stratified by years of experience.

Characteristics*	0-5 Years (N = 140)	6-15 Years (N = 159)	>15 Years (N = 195)	*P* value
Beneficiary count†	22 (15, 38)	30 (16, 47)	28 (16, 50)	0.04
Total claims filed for opioid prescriptions	26 (17, 46)	36 (17, 66)	37 (20, 72)	0.01
Total number of days of opioid prescribed	207 (128, 408)	281 (133, 619)	283 (143, 632)	0.04
Total number of days of opioid per claim	8 (6, 10)	7 (6, 1)	8 (6, 12)	0.87

* Continuous data reported as median (interquartile range). *P* values refer to the omnibus statistic produced by the Kruskal-Wallis test. A *P* value less than <0.05 suggests that at least one of the groups differ from the others.
† Based on 426 available observations.

Table 4
Prescribing characteristics of gynecologic oncologists in the 2016 Medicare Part D beneficiary database stratified by region of practice.

Characteristics*	South (N = 224)	Midwest (N = 97)	West (N = 91)	Northeast (N = 82)	*P* value
Beneficiary count†	31 (17, 53)	25 (15, 37)	30 (18, 47)	20 (14, 29)	<0.01
Total claims filed for opioid prescriptions	43 (24, 76)	28 (16, 62)	35 (20, 62)	25 (14, 36)	<0.01
Total number of days of opioid prescribed	333 (168, 699)	244 (117, 547)	231 (142, 581)	177 (92, 325)	<0.01
Total number of days of opioid per claim	8 (6, 12)	8 (6, 12)	7 (6, 10)	7 (5, 11)	0.01

* Continuous data reported as median (interquartile range). *P* values refer to the omnibus statistic produced by the Kruskal-Wallis test. A *P* value less than <0.05 suggests that at least one of the groups differ from the others.
† Based on 426 available observations.

certified gynecologic oncologist, total number of opioid claims increased by 0.02 ($P< 0.01$). The number of beneficiaries, total claims filed per provider, and number of days of opioid prescribed varied significantly between providers with 0-5 years of experience and those with >15 years of experience as well as between those with 0-5 years of experience and 6-15 years of experience ($P< 0.05$). However, there were no significant differences between those with 6-15 years and >15 years of experience. Number of days per claim did not differ significantly with years of experience (Table 3). Physicians who were board certified in palliative care (n = 19) had significantly more opioids claims (median 40; IQR 18, 91) than those without (median 32; IQR 18, 64; $P< 0.01$).

Opioid prescription patterns by region

Physicians in the South had the greatest number of opioid prescriptions, followed by physicians in the West, Midwest, and finally in Northeast, who had the fewest. In addition, physicians in the South had a significantly greater median number of opioid prescriptions compared to physicians in the Northeast (43; IQR 24, 76 vs 25; IQR 14, 36, $P < 0.01$). When comparing length of prescription courses, there were no significant differences between the South and Midwest ($P = 0.37$) or between the West and Northeast ($P= 0.29$; Table 4).

Discussion

This study broadly characterizes opioid prescription practices by US gynecologic oncologists treating Medicare beneficiaries and demonstrates the heterogeneity of opioid prescription in this population. Based on the examined cohort, we found the majority of prescriptions were for short courses of short-acting opioids, suggesting prescription for acute pain such as postoperative prescription is most common. Thirteen types of opioids were prescribed, with 7 different types representing less than 5% of total opioid claims (Figure). Our data also suggest that male

physicians are more frequent prescribers of opioids than females including after adjusting for differences in years since board certification and region of practice but prescribe similar lengths of treatment (Table 2). Regionally, gynecologic oncologists from the South had significantly more opioid claims on average than gynecologic oncologists from the Northeast, although length of prescription was similar (Table 4). Prescriber experience was also associated with increased opioid prescription metrics including number of beneficiaries, number of claims and total days of prescribed treatment (Table 3). These findings demonstrate variations in opioid prescription based on prescriber gender, experience and practice region.

Our study is the first to characterize opioid prescription using a large cohort of gynecologic oncologists treating Medicare Part D enrollees nationwide. Previous studies of opioid prescription after benign gynecologic surgery have shown that 98% of patients received an opioid postoperatively, most commonly oxycodone or hydrocodone with a median total prescription of 150-200 oral morphine equivalents. They also show that prescription far exceeds use; patients are prescribed 2-4 times more opioids than are actually used and 90% have unused opioids 2 weeks after surgery.[7,8] Existing studies have established patient factors that are associated with increased opioid consumption, such as preoperative opioid use, depression, and route of surgery. However, our study emphasizes the role of prescriber factors. Data from other surgical specialties show prescriber gender, geographic location, board certification, experience, and fellowship training also influence opioid prescribing patterns.[9-13]

We found that gynecologic oncologists with >15 years since board certification prescribed more opioids than their earlier career counterparts. This may reflect the shift in attitudes toward opioid prescription over the past several decades. In the late 1990s, pain was conceived as the "fifth vital sign" and guidelines from major medical associations recommended comprehensive pain assessment and treatment, a paradigm shift that may have led to overprescribing of opioids.[14-18] By the early 2000s, opioid misuse was identified as a national problem and there was a concerted effort from the Food and Drug Administration, Centers for Disease Control and Prevention, and other federal agencies to reduce misuse and develop public education about this. Recent data show enhanced recovery after surgery protocols improve a number of postoperative outcomes and a more cautious approach to prescribing opioids has been adopted.[19,20] Gynecologic oncologists who completed their training before or after this transitional period may have distinct prescribing behaviors.

Our findings identify regional differences in opioid prescription among gynecologic oncologists, notably between the South and Northeast. This is supported by existing large scale studies that show geographic variation in minimally invasive versus open surgical approach for treatment of gynecologic cancer.[21,22] Legislation could also contribute to the identified regional variation. Forty-seven US states have enacted legislation limiting length of opioid prescription and dosage with more than 20 states regulating emergency dispensation and refills.[23] Although aimed at curbing opioid misuse, these policies could limit access to treatment for women with gynecologic cancer despite limited evidence that opioids prescribed for this indication contribute to the national problem of misuse.[4]

Other authors have identified pain management education for providers as an unmet need[24] and this may also contribute to heterogeneity in opioid prescription practices. Despite 52% of gynecologic oncology fellowship program directors identifying opioid use as a critical education topic, a recent survey of fellows reported that only 20% were educated on opioid management techniques.[25,26] An increased emphasis on opioid education may foster prescribing practices that are safe and effective for patients and prescribers.

The present study identifies several factors associated with increased opioid prescription but further research is needed to address the underlying reasons for these variations. For example, future studies using institutional data and state-specific legislative analysis may elucidate reasons for geographic variation in opioid prescription. Future studies should also address the prevalence of opioid misuse specific to disease site and cancer treatment status. These data are necessary to define best practices that balance opioid prescription to the appropriate patient with opioid misuse screening and prevention strategies.

There are several inherent limitations to our study. First, the CMS database is restricted to Medicare Part D enrollees, with the majority over 65 years of age. Although Medicare Part D is the largest US single payer of prescription medications, this database may not capture opioid prescription trends in patients with gynecologic malignancies that present at an earlier age. Moreover, the CMS database does not include information on the context of opioid prescription for specific patients or procedures. Opioids prescribed by gynecologic oncologists to patients with benign disease cannot be distinguished from those with malignancies. Finally, our data cannot assess the complete pain regimen prescribed which might include nonopioid or over-the-counter medications or nonpharmacologic therapies. Despite these limitations, our analysis provides important insight into opioid prescription practices among gynecologic oncologists.

Conclusion

There is significant heterogeneity in opioid prescription to Medicare Part D beneficiaries based on prescriber gender, region of practice, and years of experience. Understanding these prescribing patterns is the primary step in generating guidelines that reduce overprescribing of opioids while ensuring treatment for the appropriate patient.

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