HHS Public Access

Author manuscript

Anesth Analg. Author manuscript; available in PMC 2022 June 01.

Published in final edited form as:

Anesth Analg. 2021 June 01; 132(6): 1748–1755. doi:10.1213/ANE.0000000000005399.

Opioid Prescriptions by Pain Medicine Physicians in the Medicare Part D Program: A Cross-Sectional Study

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Abstract

BACKGROUND: Pain medicine physicians (PMP) are a group of physicians with background training in various primary specialties with interest and expertise in managing chronic pain disorders. Our objective is to analyze prescription drug (PD) claims from the Medicare Part D program associated with PMP to gain insights into patterns, associated costs, and potential cost savings areas.

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This manuscript was handled by: Honorio T. Benzon, MD.

The authors declare no conflicts of interest.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's website (www.anesthesia-analgesia.org).

METHODS: The primary data source for Part D claims data is the Centers for Medicare and Medicaid Services (CMS) Chronic Conditions Data Warehouse, which contains Medicare Part D prescription drug events (PDE) records received through the claims submission cutoff date. Only providers with taxonomies of pain management (PM) and interventional pain management (IPM) were included in the study. The analysis of PDE was restricted to drugs with >250 claims. The distribution of claims and costs were analyzed based on drug class and provider specialty. Subsequently, we explored claims and expenses for opioid drug prescriptions in detail. Prescribing characteristics of the top 5% of providers by costs and claims were examined to gain additional insights. The costs and claims were explored for the top 10 drugs prescribed by PMP in 2017.

RESULTS: There were a total of unique 3280 PMP-prescribed drugs with an associated expense of 652 million dollars in the 2017 Medicare Part D program. Prescriptions related to PMP account for a tiny fraction of the program's drug expenditure (0.4%). Opioids, anticonvulsants, and gabapentinoids were associated with the largest number of claims and the largest expenses within this fraction. Among opioid drug prescriptions, brand-named drugs account for a small fraction of claims (8%) compared to generic drugs. However, the expenses associated with brand name drugs were higher than generic drugs. Prescribers in the top 5% by PD costs had a higher number of claims, prescribed a higher proportion of branded medications, and had prescriptions associated with longer day supply compared to an average PMP. There were several opioid medications in the top 10 PD list by cost associated with PMP.

CONCLUSIONS: Opioids were the most common medications among Medicare part D claims prescribed by PMP. Only 12% of the total opioid PD claims were by PMP. The top 5% of PMP prescribers had 10 times more claims than the average PMP.

Health care spending in the United States continues to rise and is a significant concern for all stakeholders. The United States spent 17.9% of the gross domestic product (GDP) on health care in 2016. Prescription drug (PD) costs amounted to 10.4% ($329 billion) of the same year's total health care costs.[1] These increasing costs put a strain on the viability of PD benefit and health insurance benefit programs. In the last 2 decades, we have also experienced an opioid crisis due to an increase in illicit drug use and the use of PD for the treatment of acute and chronic pain.[2] This crisis has led to increasing addiction rates, loss of productivity, and increased mortality due to PD overdose. Several strategies are currently deployed to manage the supply and the demand sides of the opioid crisis. These strategies include screening, education, PD monitoring, diversion monitoring, guideline development, abuse-deterrent drug development, and treatment of opioid addiction.

Pain medicine physicians (PMP) are a group of physicians with background training in various primary specialties with interest and expertise in managing chronic pain disorders.[3] Often, they use medications, physical therapy, behavioral therapy, and in selected patients, procedural interventions to alleviate pain and associated suffering. PMPs are in a unique situation to affect the rising health care costs and to curb the PD crisis. As our strategies to tackle the PD crisis take into effect, we notice shifting of prescriptions from other specialty physicians and increasing rates of opioid drug prescriptions among PMP and physical medicine and rehabilitation physicians.[4] Medicare Part D is the most extensive PD benefit program in the United States for self-administered PD. The program does not cover claims for nurse-administered medications or infusion therapy. This study analyzes PD Medicare

Part D claims associated with PMP to gain insights into patterns, associated costs, and potential areas of cost savings.

METHODS

Protocol

The protocol was developed by authors (V.G. and C.S.) at their academic center. The study review was deemed exempt by the institutional review board, given the retrospective data analysis of deidentified publicly available data sets. The article adheres to the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) reporting guidelines.

Data Source

Medicare PD benefit or "Part D" provides coverage for self-administered PD. The Medicare program insures all individuals ≥65 years of age and individuals with a disability or requiring dialysis. The program offered medical insurance benefits for around 56.8 million individuals (17.6% of the US population) in 2017.[5] The Part D program is delivered through several stand-alone PD plans and Medicare Advantage PD plans. A total of 45.2 million individuals were enrolled in the Part D program in 2017.[6] The Centers for Medicare and Medicaid Services (CMS) provides publicly available data with information on prescription drug events (PDE) incurred by Medicare beneficiaries. The Part D claims data are released under a "final rule" for program monitoring, research, public health, care coordination, quality improvement, the population of personal health records, and other purposes. The primary data source for these data is the CMS Chronic Conditions Data Warehouse, which contains Medicare Part D PDE records received through the claims submission cutoff date. The PDE events are a summary extract of CMS defined standard fields. The data included identifiers such as prescriber National Provider Identification (NPI) number, drug utilization information, drug cost, and coverage information. A brief overview of the health care system and the Part D program is listed below.

BRIEF INTRODUCTION TO THE US HEALTH CARE SYSTEM AND THE ONGOING OPIOID CRISIS

Health care in the United States is funded by combination of private- and government-sponsored insurance programs. Medicare is a government-funded public insurance program that insures virtually all elderly individuals (age ≥65 years), disabled people, and people on dialysis. The Part A of the program finances hospital, hospice, and skilled facility charges. The Part B of the program pays for physician fees and for outpatient hospital services. The Part C of the program pays for payments to different types of plans such as Preferred Provider Organizations (PPO). PPO is a medical network of providers and facilities that have agreed to provide care at a reduced rate to subscribed clients. The Part D program provides PD benefit to eligible individuals. The Part D prescriber public user file (PUF) provides information on PDs by individual physicians and other health care providers. PDE is a claim for reimbursement for an individual drug prescription. The amount of prescription opioid drugs in the United States has been steadily increasing since 1990 resulting in misuse, opioid use disorder, and overdose-related deaths. Recent studies have shown that

opioid prescriptions were decreasing for all specialties except for pain medicine and physical rehabilitation medicine. In this study, we evaluate the largest PD benefit program to gain insights into prescription practices among PMP.

Development of the Cohort

We designed a cross-sectional study to analyze the prescription patterns among PMP, providing care for the Medicare Part D beneficiaries for 2017. The 2017 PUF is the most recent complete data set available at the time of data analysis. All claims submitted by June 30, 2018 were included in the PUF. The physician's specialty was determined from the Medicare provider/ supplier specialty code reported on their NPI's part B claims. When more than 1 specialty code is attributed to an individual provider, the Medicare specialty code with the largest number of services is reported. A crosswalk linking the Medicare provider/supplier specialty code to health care taxonomy is published by Centers for Medicaid and Medicare Services.

Only providers with taxonomies of pain management (PM) and interventional pain management (IPM) were included in the study (Supplemental Digital Content, Table 1, http://links.lww.com/AA/D371). The spending and utilization data are aggregated to the prescriber's NPI and the type of drug in the PUF. Providers with fewer than 10 claims were suppressed in the data set to protect the privacy of the beneficiaries. Additional details of data suppression and redaction are listed in reference 7.

Statistical Analysis and Reporting

We summarized overall PD claims associated with PMP for the year 2017. Overall prescribing patterns were compared to all other providers. The analysis of PDE was restricted to drugs with >250 claims. The drugs were classified into opioids, nonpain related, muscle relaxants, neuropathic anticonvulsants, antiinflammatory, antidepressants, stimulants, and benzodiazepines. A generic drug refers to the chemical ingredient of a drug, and the brand name relates to a trademarked brand name under which the drug is sold. A descriptive analysis was performed, and categorical outcomes were described as proportions or percentages, and continuous outcomes were expressed as median with interquartile ranges. Statistical tests of significance were not performed by design due to the huge nature of the datasets and the probability of attaining statistical significance with small differences even after adjustment. Moreover, the measures reported are for the entire dataset (no sampling variability) and are not from a sample. The distribution of claims and costs were analyzed based on drug class and provider specialty. Subsequently, we explored claims and expenses for opioid drug prescriptions in detail. Prescribing characteristics of the top 5% of providers by costs and claims were examined to gain additional insights. Prescription patterns for abuse-deterrent drugs (Supplemental Digital Content, Table 2, http://links.lww.com/AA/D371) were also analyzed. The costs and claims were explored for the top 10 drugs prescribed by PMP in 2017. Opioid PD claims associated with PMP were also analyzed for years 2013 and 2015 and were compared to claims associated with family medicine physicians. Summaries and figures were conducted with R v3.6.3 (Vienna, Austria).

RESULTS

Baseline Characteristics

In 2017, the total Medicare part D claims amounted to 54.7 billion US dollars providing PD benefits for >35 million beneficiaries. We analyzed prescriptions by 3820 PMP (0.26% of all providers), which included 1643 (43%) IPM and 2177 (57%) PM physicians. Combined, the PMP-prescribed medications associated with >8 million claims totaling 652 million US dollars. Both IPM and PM prescriptions contributed almost equally to the expenses, 321 and 331 million US dollars, respectively (Table 1).

Classification of PDs

The PD's with over 250 claims were classified into various drug classes. PD's with ≤250 claims were associated with <1% of the total expenditure. PMP prescribed a total of 276 unique drugs. Non–pain-related drugs and opioid drug categories had a higher number of unique medications (Supplemental Digital Content, Table 3, http://links.lww.com/AA/D371). PMP prescribed a total of 143 unique non–pain-related drugs and 49 unique opioid medications in 2017.

Distribution of Claims and Costs of PDs Associated With PMP

Opioid drugs and anticonvulsant/gabapentinoids are associated with the largest number of prescription claims associated with PMP (Figure 1), costing 378 and 133 million dollars, respectively. In 2017, all providers prescribed opioids related to a total cost of 3.1 billion US dollars. PMP opioid prescriptions accounted for only 12% of the total opioid prescription costs for the Medicare Part D program. Opioid PD accounts for 58% of the total drug costs associated with PMP, while opioid PD account for 2% of the program costs for all providers. The distribution of the claims and costs of drugs were very similar among IPM and PM groups (Supplemental Digital Content, Figure 1, http://links.lww.com/AA/D371).

Brand Versus Generic Prescription Opioid Drugs Associated With PMP

Claims and costs associated with trademarked (brand) and generic PD are illustrated in Figure 2. Even though generic drugs are associated with more claims, expenditure on claims related to trademarked (brand) drugs was higher. The trends are very similar among branded and generic prescriptions associated with IPM and PM groups, respectively (Supplemental Digital Content, Figure 2, http://links.lww.com/AA/D371).

Characteristics of PMP Providers that Account for the Top 5% of the Opioid Prescribing Costs in the Year 2017

A total of 179 providers accounted for the top 5% of the costs associated with prescription opioid drugs among PMP. The median total drug cost and the number of beneficiaries receiving prescriptions per provider were higher among the top 5% of providers by expenses than the whole group (Table 2). More trademarked (brand) drugs than generic drugs were prescribed by the top 5% of prescribers by costs than the average PMP prescriber (42.9% vs 16.7% brand, respectively). Claims associated with abuse-deterrent opioid PD accounted for <5% of the total expense.

Top 10 PDs Associated With PMP in the Year 2017

Pregabalin-Lyrica (Pfizer, New York, NY) was the top drug associated with PMP PD costs (Supplemental Digital Content, Table 4, http://links.lww.com/AA/D371). The top 10 medications by cost included several branded opioid medications. The drugs by groups (IPM and PM) are listed in the Supplemental Digital Content, Tables 5 and 6, http://links.lww.com/AA/D371. Many of the drugs in the top 10 list were prescribed by the majority (>50%) of PMP providers. The average supply of medications with each claim was for a month with more prescriber variability for Doxepin HCL and Lidocaine.

Temporal Trends of Opioid PD Associated With PMP and Comparison to Family Medicine Physicians

The numbers of physicians with part D claims among PMP increased while the numbers of family medicine physicians with part D claims decreased from 2013 to 2017 (Table 3). Opioid PD costs accounted for more than half of the PD costs associated with PMP, while the costs were around 5% for family medicine physicians (Figure 3).

DISCUSSION

PD are an important part of team-based chronic PM. Our study provides a comprehensive analysis of PD claims associated with PMP from the Medicare Part D program. The main findings of our study are as follows: (1) There were a total of unique 3280 PMP that prescribed drugs with an associated expense of 652 million dollars in the 2017 Medicare Part D program. (2) Prescriptions by PMP amount for a tiny fraction of the program's drug expenditure (0.4%). (3) Opioids, anticonvulsants, and gabapentinoids are associated with most claims and the largest expenses. (4) Among opioid drug prescriptions, trademarked (brand name) drugs account for a small fraction (8%) compared to generic drugs. However, the expenses associated with brand name drugs were higher than generic drugs. (5) PMP opioid prescriptions accounted for only 12% of the total opioid prescription costs for the Medicare Part D program. Opioid PD accounts for 58% of the total drug costs associated with PMP, while opioid PD account for 2% of the program costs for all providers. (6) Prescribers in the top 5% by PD costs had a higher number of claims, were prescribed a higher proportion of branded medications, and had prescriptions associated with longer day supply compared to an average PMP. (7) There were several opioid medications in the list of top 10 PD by cost associated with PMP. (8) PMP-associated prescription costs were mostly due to opioid PD (>50%) from 2013 to 2017 when compared to claims associated with family medicine (<5%).

Analysis of Medicare Part D PD claims yielded unique insights over the last few years that include specialty prescribing patterns, potential areas of cost savings, effect on health care disparities, adherence to treatment regimens, and patien's interest in cost-saving through dose adjustment. Analysis has also informed us about opioid drug prescriptions and their impact on readmission, patient mortality, and the contribution of advanced practice providers (APPs) to opioid drug prescribing patterns.[8–18]

It was not unexpected to see increasing rates of opioid prescriptions among PMP and physical and rehabilitation medicine providers while opioid prescribing trends continue to decline for other specialities.[4] It is possible that PMP, regardless of their preference to provide multidisciplinary care, are the only physicians left to prescribe opioid drugs as other specialty physicians are unwilling to unable to exercise opioid PD therapeutic option. Several factors, such as higher doses of opioid drug prescriptions (>100 morphine milligram equivalents), multiple providers, and multiple dispensing pharmacies, correlate with adverse outcomes.[19] The PMP societies should promote programs to disseminate knowledge, educate providers about ways to minimize opioid drug prescriptions, and encourage research into novel pain treatments/therapies. Our study highlights similar rates of PD among providers who identify as practitioners of PM versus IPM. We also found a wide variation of opioid prescriptions by PMP. The top 5% of prescribers had more than 10 times the expenses associated with PD than an average PMP prescriber. Financial industry payments have been related to prescriptions for costly drugs, and drug diversion cases have been described among PMP.[20,21] Additional research is required to understand the unique patient characteristics and outcomes associated with these providers. Understanding the trends and societal implications is essential for PMP society's stewardship through self-regulation.

Our study also highlights potential savings for the Part D program from expenses related to brand name drugs compared to generic drugs. Negative perceptions of generic drugs by providers and patients present as a barrier for universal acceptance even when their efficacy is similar to branded drugs.[22] The brand name PD had similar expenses, even though they were <1% of the claims. PMP can do their part in reducing these expenses by following clinical guidelines and by being a well-informed consumer of comparative effectiveness research.[23]

The role of APPs in pain medicine is evolving and, as our systems become complex, integrated delivery of care is essential for good outcomes. Recent studies show high rates of opioid prescriptions among the APP.[8] Effective monitoring systems should include both PMP and pain medicine APP in their analysis.

LIMITATIONS

Our study can only be interpreted in light of its limitations. The data presented in Medicare Part D claims are cross-sectional data, and we were unable to establish any causal relationships. As our study was an administrative claims study, we could not evaluate prescribing rationales and individual physician characteristics associated with higher opioid PD claims in our study. Like any other administrative database, these results are subject to errors and misclassification. However, several studies published from the Medicare Part D claims provided critical insights into physician prescribing patterns in other specialties. We did not analyze the temporal and geographic trends among PMP providers. Individual drugs with claims <10 were suppressed, so we have an underreporting of beneficiaries in our aggregate counts. Finally, we do not have unique patient characteristics, medication dose, and their subsequent outcomes of clinical conditions necessitating these drug prescriptions.

CONCLUSIONS

Opioid PD are the most common medications among Medicare part D claims prescribed by PMP. Only 12% of the opioid PD claims were associated with PMP. There is significant variation among PMP with prescribers in the top 5% with claims 10 times more than an average PMP physician. Cost-effectiveness analysis studies are required to guide PMP on the use of brand versus generic drugs.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

ACKNOWLEDGMENTS

The authors thank Michael Todd, MD, Professor of Anesthesiology, for his guidance during the study.

GLOSSARY

APP	advanced practice provider
CMS	Centers for Medicare and Medicaid Services
CNS	central nervous system
GDP	gross domestic product
IPM	interventional pain management
NPI	National Provider Identification
PD	prescription drugs
PDE	prescription drug events
PM	pain management
PMP	pain medicine physicians
PPO	Preferred Provider Organizations
PUF	public user file
STROBE	Strengthening the Reporting of Observational studies in Epidemiology

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KEY POINTS

- **Question:** What are the characteristics of prescriptions drugs (PD) by pain medicine physicians (PMP) in the 2017 Medicare Part D program?
- **Findings:** Opioid PD were the most frequently prescribed drugs (58% of total costs) in the Medicare Part D program by PMP, and the top 5% of PMP opioid PD prescribers had 10 times more claims than the average PMP.
- **Meaning:** Awareness, education, and oversight may be necessary to reduce opioid PD use by PMP.

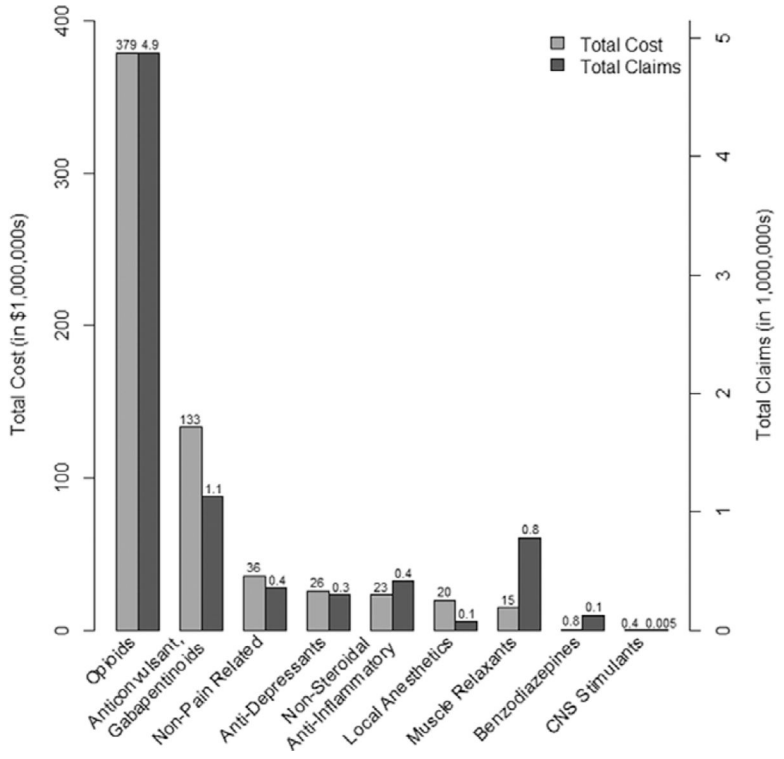

Figure 1.

Distribution of claims and costs associated with prescriptions by PMP in the year 2017. The bar graph displays various classes of drugs on x-axis. Associated costs (left-sided) and claims (right-sided) are shown on y-axis. The y-axes for claims and expenses are adjusted for tche opioid class of drugs, so the bar graphs' height is the same. CNS indicates central nervous system; PMP, pain medicine physicians.

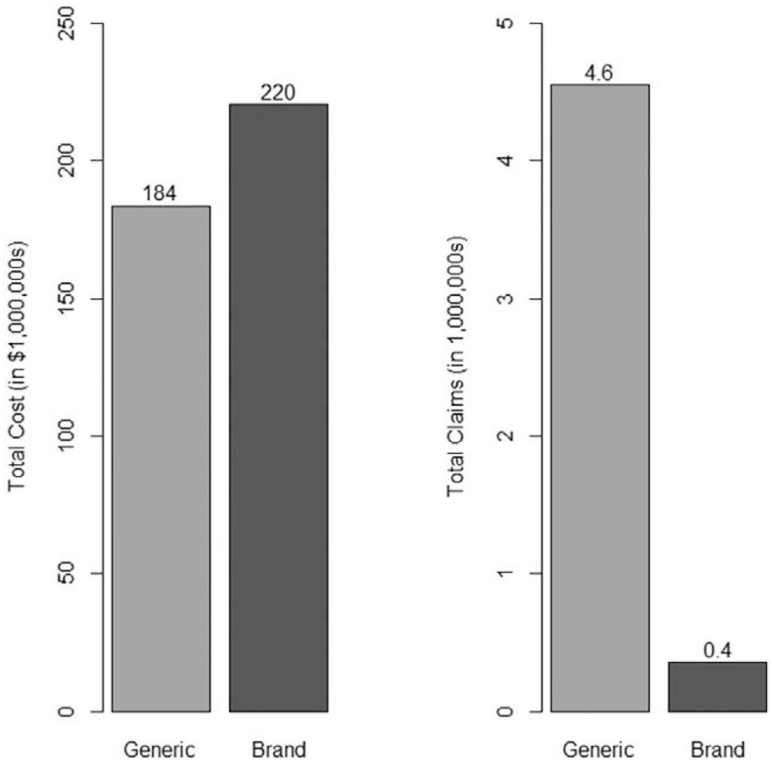

Figure 2.

Distribution of claims and costs associated with opioid drug prescriptions by PMP in the year 2017. The bar chart illustrates claims and expenses on the y-axis and the class of drugs on the x-axis. Brand refers to trademarked (brand named) drugs. PMP indicates pain medicine physicians.

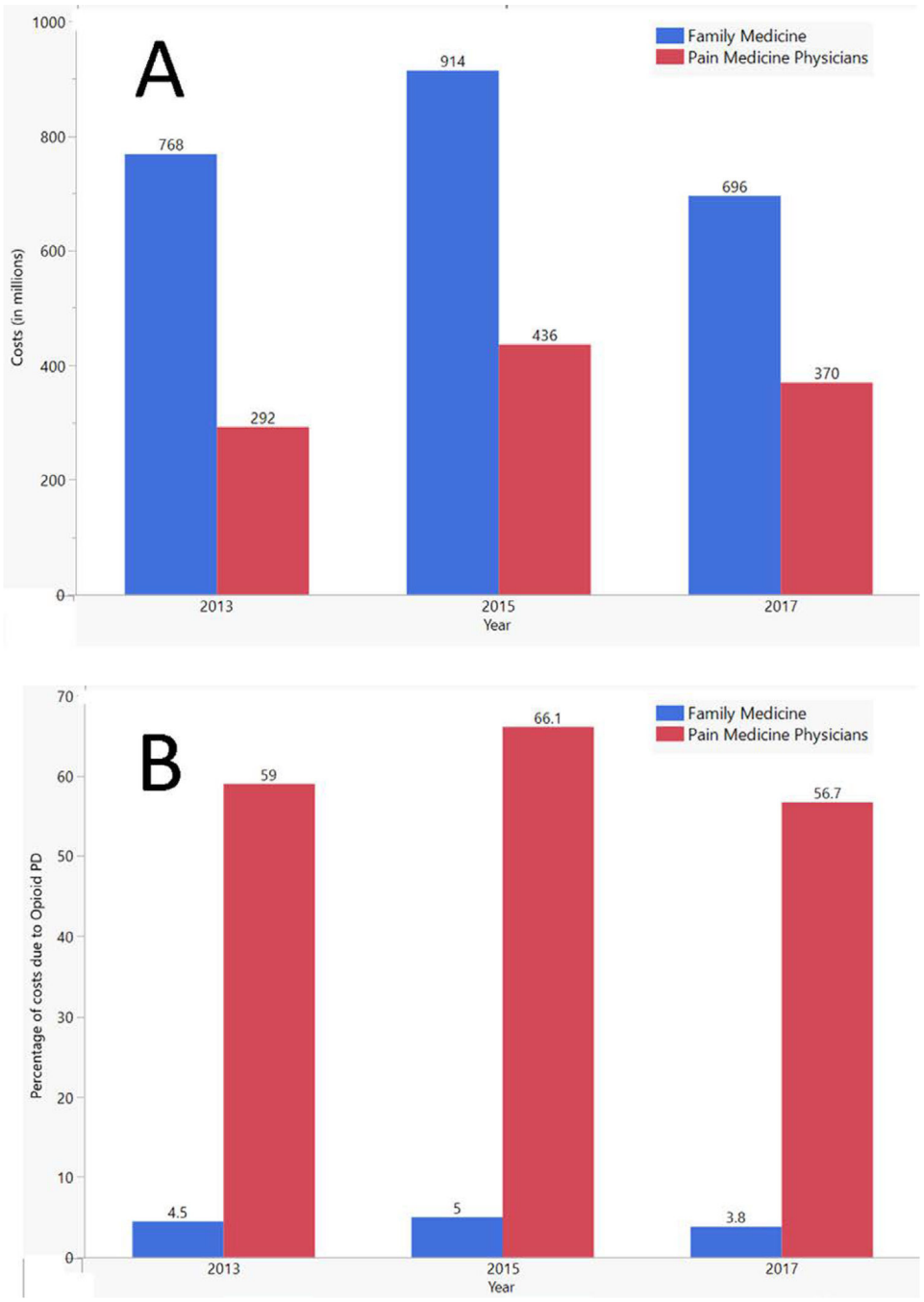

Figure 3.

Longitudinal comparison of opioid PD claims by PMP compared with family medicine physicians. A, The total costs attributed to opioid PD. B, The percentage of opioid PD for PMP and family medicine physicians. PD indicates prescription drug; PMP, pain medicine physicians.

Table 1.

Characteristics of Part D Claims Associated With PMP Providers

Group	Total drug cost (miNions US $)	Total claim count	Beneficiary count	Number of drugs	Number of unique providers
IPM	322	4,012,251	911,766[a]	705	1643
PM	331	4,263,623	1,005,608[a]	627	2177
PMP	652	8,275,874	1,917,374[a]	815	3820
Part D program	154,798	1,495,395,471	41,966,652	2821	1,439,713

The information presented in the table includes all drugs, even with claims <250.

Abbreviations: IPM, intervention pain management; PM, pain management; PMP, pain management physicians.

[a]The beneficiary count information is missing for 51% of records associated with PMP prescriptions in the public user file. Beneficiaries counts <11 for an individual drug or a provider are suppressed to protect patient privacy. Therefore, beneficiary counts associated with prescriptions from PMP are an underestimation.

Table 2.

Characteristics of Providers Associated With the Top 5% of Medicare Part D Opioid Prescription Drugs Costs for the Year 2017

Group	Total drug cost in US dollars	Total beneficiaries	Total day supply	Trademarked (brand) drugs %	Abuse-deterrent drugs%	PM % (versus IPM)
Pain medicine (N = 81)	598,388 (515,298, 748,333)	876 (612, 1493)	154,636 (102,377, 244,075)	10.0 (7.5, 15.2)	4.7 (2.7, 7.7)	100.0
IPM (N = 98)	648,728 (544,185, 868,575)	916 (603, 1391.5)	161,293 (102,016, 239,572)	12.1 (7.7, 17.5)	4.3 (3.0, 6.4)	0.0
Total pain (N = 179)	623,218 (527,724, 824,016)	891 (605, 1478)	160,254 (102,042, 241,692)	11.0 (7.6, 16.4)	4.4 (2.9, 6.6)	45.3
Entire group (N = 3579)	43,793 (8921, 132,255)	163 (53, 387)	19,213 (5516, 48,686)	4.3 (0.0, 9.8)	1.7 (0.0, 4.5)	56.9

For all variables, the median, 25th, and 75th percentiles are presented in the table. The top 5% of providers from PM and IPM groups were selected from the entire group. IPM group is considered the referent group for analysis.

Abbreviations: IPM, intervention pain management; PM, pain management.

Table 3.

Temporal Patterns of Opioid PD Claims Among PMP and Comparison to Family Medicine Physicians

	2013	2015	2017
Number of physicians	**3084**	**3383**	**3579**
with Part D claims	*77,224*	*75,533*	*73,546*
Number of opioid PD	**3.17**	**4.43**	**4.86**
claims (in millions)	*19.48*	*19.33*	*17.41*
Proportion of physicians	**95.7**	**95.2**	**93.7**
with opioid PD claims	*80.9*	*77.7*	*73.3*

Bold values indicate pain medicine physicians. Italic values indicate family medicine physicians. Opioid PD costs associated with family medicine physicians and PMP amounted to 22% and 12%, respectively, of total opioid PD costs.

Abbreviations: PD, prescription drug; PMP pain management physicians.