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A comparison of trends in opioid dispensing patterns between Medicaid pharmacy claims and prescription drug monitoring program data

Sanae El Ibrahimi[1,2], **Sara Hallvik**[1], **Kirbee Johnston**[3], **Gillian Leichtling**[1], **Esther Choo**[4], **Daniel M. Hartung**[3]

[1]Department of Research and Evaluation, Comagine Health, Portland, Oregon

[2]Department of Epidemiology and Biostatistics, School of Public Health, University of Nevada, Las Vegas, Nevada

[3]College of Pharmacy, Oregon State University, Corvallis, Oregon

[4]Center for Policy and Research in Emergency Medicine, Oregon Health & Science University, Portland, Oregon

Abstract

Purpose: Public and private payers have implemented benefit limitations to reduce high-risk opioid prescriptions. The effect of these policies on the increase of out-pocket payment is unclear. To understand this gap, we compared the discrepancies in trends between opioid prescription fills vs claims among Medicaid beneficiaries.

Methods: Data from the Oregon Prescription Drug Monitoring Program (PDMP) and Oregon Medicaid administrative claims were used to identify Medicaid beneficiaries 18 years and older enrolled at least one full month from 2015 to 2017. Generalized linear models assessed the trends in the monthly rates of opioid PDMP prescription fills and pharmacy claims per 1000 eligible members. Rates by morphine equivalent dose (MED) tier (<50, 50–89, 90–120, >120 MED) and co-prescribed opioid and benzodiazepine were also assessed.

Results: During the study period, an average of 495 355 Medicaid members had 2 797 054 opioid PDMP fills and 2 472 155 opioid Medicaid pharmacy claims. Study participants had 15.4 (95% confidence interval [CI] 13.6 to 17.0; $P < .001$) more prescriptions per 1000 member per

Correspondence: Sanae El Ibrahimi, Comagine Health, 650 NE Holladay St #1700, Portland, OR 97232. selibrahimi@comagine.org.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

ETHICS STATEMENT

This study has been reviewed and approved by the Oregon Health & Science University and the Oregon Public Health Division Institutional Review Boards.

PATIENT CONSENT STATEMENT

This study was exempt from patient consent.

month in the PDMP data (114.1 [*SD* 7.4]) compared with the Medicaid claims data (98.7 [*SD* 7.9]). Similarly, there were 1.9 more co-occurring opioid/benzodiazepine prescriptions per 1000 members per month observed in the PDMP data than the Medicaid claims data (95% CI 1.7 to 2.1; $P < .001$). At each MED tier, the PDMP fills were consistently higher than the claims ($P < .001$).

Conclusions: Higher rate of fills in the PDMP compared to pharmacy claims suggests that there may be an increasing trend of out-of-pocket payment among Medicaid beneficiaries.

Keywords

opioid prescriptions; Oregon Medicaid; out-of-pocket payment; pharmacoepidemiology; prescription drug monitoring program

1 | BACKGROUND

Prescription opioids were the primary catalyst in the evolving opioid epidemic and continue to be involved in over a third of all opioid deaths.[1] Many states and payers have enacted and implemented initiatives to reduce opioid prescribing and attendant risks.[2–9] States with higher nonmedical use of opioid analgesics were at the forefront of enacting policies to reduce high-risk opioid prescribing. Compared with other states, prescribing opioids is overall higher in Oregon. For instance, in 2017, Oregon prescribers wrote 66.1 opioid prescriptions per 100 persons, contrasted to an average rate of 59.0 per 100 persons in the US.[10] After reports showing that Oregon was leading the nation in nonmedical use of prescription opioids,[11] the state's public health officials and policymakers responded with multidimensional strategies to fight the crisis.[8,12,13]

The Oregon Health Authority (OHA) Opioid Initiative launched in 2015 aims to reduce opioid harms in patients, reduce risky opioid prescribing, and improve access to medication-assisted treatment, as well as nonopioid pain treatments, while using data to inform and track the initiative's impact.[13] While the initiative targeted health care settings across the state, particular guidelines were specific to the Medicaid program. Mainly, the initiative required Coordinated Care Organizations (CCOs) to engage in Performance Improvement Projects (PIP) to decrease risky opioid prescribing to Medicaid recipients.[14] Preliminary reports show a positive downward trend in both risky opioid prescribing (ie, prescriptions for ≥90 and ≥120 mg morphine equivalent dose [MED] per day) and fatal opioid overdoses in the period after the initiative (2017).[12,13] Prior to the OHA Opioid Initiative, the Oregon Medicaid program implemented a prior authorization policy, which also contributed to a significant decline in high dose of opioid prescriptions.[9] Other statewide initiatives that are likely to contribute to the observed opioid prescription declines are prescriber and pharmacist education programs (eg, targeted academic detailing) and the promotion and simplification in use of the Oregon Prescription Drug Monitoring Program (PDMP).[15–18] On the heels of these programs, in 2016 OHA issued guidelines directing CCOs to limit coverage for opioids to treat back pain and expand coverage for evidence-based non-pharmacologic therapies, such as acupuncture, massage, and yoga.[19]

There are growing concerns and emerging evidence that restrictive policies, such as those implemented in Oregon, may have unintended negative consequences, such as sub-optimal

pain treatment, self-harm, increased demand for illicit, or diverted opioids (eg, heroin), and that individuals may circumvent policy restrictions by paying cash out-of-pocket for opioid prescriptions. A study by Roberts et al found an increased likelihood of paying out-of-pocket for controlled substances after referral to a lock-in program in North Carolina's Medicaid program.[9,20] Prior studies in Oregon estimated that 13.5% of dispensed opioids among Medicaid beneficiaries were potentially paid out-of-pocket; however, these estimates used data prior to OHA's opioid initiative (2012–2013).[21] Therefore, we expect trends in potential cash-pay opioid fills, particularly in the period of the OHA Opioid Initiative, to increase.

This study aims to compare the trends in prescription opioid utilization using Medicaid pharmacy claims and PDMP data in a cohort of Medicaid beneficiaries in Oregon from 2015 to 2017. As increasingly restrictive opioid policies and initiatives are implemented in the Medicaid program, we hypothesize that there will be increasing discrepancy in opioid fills "unaccounted for" within the Medicaid program as a function of increasing cash payments observed in the PDMP. These trends will also vary by prescription metrics (eg, morphine equivalent dose (MED) tiers and co-prescribed opioid and benzodiazepine prescriptions).

2 | METHODS

2.1 | Data sources

We captured data on dispensed opioid fills from the PDMP and data on opioid prescriptions paid by the Medicaid program from pharmacy claims. The Oregon Medicaid program is administered through 16 regionally operated CCOs and the traditional fee-for-service (FFS) program, which service approximately 10% of Medicaid recipients. Although each CCO and the FFS program develop and implement their own pharmacy benefit package, all are governed by federal regulations that mandate basic coverage floors and nominal patient cost-sharing requirements. Paid pharmacy claims used for this study are derived from all CCOs and the FFS program.

The Oregon PDMP has been operational since 2011 and records all dispensed Schedule II-IV controlled substance fills in outpatient pharmacies. All Oregon-licensed retail pharmacies are required to submit prescription data no later than 72 hours after dispensing. Prescription data are typically submitted through in-house or vendor pharmacy dispensing systems. Data elements submitted include fill date, quantity dispensed, days' supply, national drug code (NDC) for medication, and information about the dispensing pharmacy and prescribing clinician. In Oregon, the source of payment is not a required data element.

2.2 | Study sample

Our study sample included Medicaid recipients with at least one full month of enrollment between 2015 and 2017. We excluded patients younger than 18 years old or with dual Medicare eligibility. Medicaid data were linked to the Oregon PDMP by an analyst at OHA using a probabilistic linkage on name, date of birth, and ZIP code using LinkKing (v7.1) software. Details of the Medicaid-PDMP linkage have been previously described.[21,22] We then summarized opioid fills and claims characteristics by month. This study focuses on

overall monthly trends of fills compared to claims without attempting to link each PDMP fill to a corresponding Medicaid pharmacy claim. Patients' prescriptions were only included in analyses in the month(s) in which they had coverage for the whole month.

2.3 | Opioid rate metrics

Opioid prescriptions in both the PDMP and the Medicaid pharmacy claims were identified using relevant NDCs listed in the Centers of Disease and Control's (CDC) National Center for Injury Prevention and Control crosswalk of opioids and MME conversions.[23] Buprenorphine was excluded. To derive monthly rates, we calculated the total number of opioid fills and claims per 1000 members per month. For each month in the study period (2015–2017), we computed the percent difference between fills and claims and plotted the trend over time.

We used the prescription quantity, days' supply, and the MME conversion factor to compute the average daily morphine equivalent dose (MED).[24] We grouped the MED into tiers (<50, 50–89, 90–120, >120 MED) and summarized the number of opioid fills and claims per 1000 members per month for each MED tier. We then contrasted the trend of opioid fills and claims over time by MED tier. Lastly, we flagged the patients who had opioid and benzodiazepine prescriptions in the same month and computed the fills and claims rates of monthly opioid-benzodiazepine overlap per 1000 members.

2.4 | Analysis

We calculated the average monthly PDMP opioid fill rate and Medicaid pharmacy claims rates per 1000 members (number of fills or claims each month divided by the number of eligible members in that month). We tested the difference in mean opioid fills and claims rates with the two-sample *t*-test. We used generalized linear models to assess the difference in linear trends from 2015 to 2017 for the monthly rates and the monthly percent differences between the fills and the claims. We contrasted the slopes for each metric and reported the significance level and the percent monthly change in rates. We also computed the differences in opioid fills and claims by MED tier and by benzodiazepine overlap status. We generated graphs to visualize trends over time for each opioid prescription metric. P values < .05 were considered statistically significant. All analyses were performed using SAS 9.4 (SAS Institute Inc, Cary NC).

Approval for this study was obtained from the Oregon Health & Science University and the Oregon Public Health Division Institutional Review Boards.

3 | RESULTS

During the study period (2015 to 2017), an average of 495 355 Medicaid members per month (*SD* 35 828; min 438 763; max 563 071) met inclusion criteria. Eligible members had 2 797 054 opioid PDMP fills and 2 472 155 opioid pharmacy claims in this period (Figure 1). The percent of eligible members who had any opioid prescription claim averaged 9% per year; however, there was a decline from 10.2% per month at the beginning of the study period to 8.2% per month at the end of the study period.

As shown in Table 1, the study participants had on average 15.4 (95% confidence interval [CI] 13.6 to 17.0; $P < .001$) more prescriptions per 1000 members per month in the PDMP data (114.1 [*SD* 7.4]) compared to the Medicaid claims data (98.7 [*SD* 7.9]). Opioid prescriptions identified in both the PDMP and claims data declined significantly over time (2.1% per month, $P < .001$) (Figure 2). However, the percent difference between the opioid fills and claims rates increased significantly by 0.01% per month ($P < .001$). We also observed seasonal variation indicating that, in the end of the calendar year, the likelihood of patients filling opioids using other means than insurance claim (ie, potential out-of-pocket payment) is lower than in other months (Figure 3).

At each MED tier (<50, 50–89, 90–120, >120 MED), the PDMP fills were consistently higher than the claims ($P < .001$); however, the gap was greater for low MED prescriptions (MED < 50) compared with the other tiers (Figure 4). The average rate of co-prescribed opioids and benzodiazepines within the same month was higher in PDMP fills compared to pharmacy claims by 2 prescriptions per 1000 members per month (95% CI 1.7 to 2.1; $P < .001$). There was a similar significant downward trend in the rate of co-prescribed opioids and benzodiazepines fills and claims ($P < .001$) over time (Figure 5).

4 | DISCUSSION

4.1 | Summary of findings

In this cohort of Medicaid enrollees, we detected significant discrepancies in opioid PDMP fills and Medicaid pharmacy claims (more fills than claims) throughout the study period (2015 to 2017), confirming our hypothesis that Medicaid pharmacy claims may underestimate actual prescription opioid utilization among Medicaid beneficiaries. Overall, opioid prescriptions accounted for 9% of the yearly prescribed drugs for Medicaid beneficiaries, which are somewhat higher than the average Medicaid programs nationwide (7.3%).[25] We also found a monthly average of 15% of opioid fills "unaccounted for" in Medicaid claims (ranging from 4% to 22%), slightly higher than the 13.5% reported before many of the OHA opioid prescribing initiatives.[21] We observed a significant downward trend in opioid prescription utilization in both PDMP and Medicaid claims, but the growing discrepancy between the data sources suggests an increasing number of prescriptions are being paid for with cash. This pattern is seen across opioid dosage levels (eg, MED tiers), particularly for low-dose opioid prescriptions. Low-dose opioid prescriptions, which are also the most common opioids prescribed, including hydrocodone (41.5% of opioid prescriptions at a median of 30 MED) oxycodone (30%, median of 50 MED)[26], are likely to be recurrent analgesic prescriptions and are also the top two opioid prescriptions used non-medically.[27] This may explain the higher likelihood of "unclaimed" opioid prescriptions at lower dosage. We also observed increasing discrepancies among opioid prescriptions with concurrent benzodiazepine prescriptions in the same month.

These trends suggest one way in which patients may circumvent new policies, blunting their intended effect. Some reports have signaled that patients prescribed controlled medications are likely to find ways to avoid restrictive policies. For instance, there has been an uptake of lock-in programs to reduce risky use of controlled substances (opioids and benzodiazepines) by "locking" patients' access to controlled substance prescription fills from a specific

provider and pharmacy.[28] A recent evaluation of a lock-in policy in the North Carolina Medicaid program found that after beneficiaries were enrolled in this program, one third paid cash for opioids, representing a 4-fold increase from before the policy.[20,29] Others have found that restrictive policies lead patients to seek prescriptions from multiple providers (doctor shopping), sometimes over long distances, and pay cash for opioid or other controlled substance prescriptions.[30,31]

It is not known whether patients' actions to circumvent restrictive policies are most common among those participating in diversion,[29] those with substance use disorders, or those with stable or high pain medication need avoiding the changes in treatment regimens.

We are unable to attribute the increase in self-paid opioid prescriptions to a specific policy, as the Oregon Health Authority has enacted several initiatives,[13] In the period from 2015 to 2017, changes that could have contributed to our findings include:

1. CCOs were required to participate in PIPs with the goal of reducing risky dosage levels in patients on long-term opioid therapy, and report quarterly to OHA the progress toward these goals (2015).
2. A guideline was implemented to limit the use of opioids as the first-line treatment for back pain while expanding coverage for evidence-based non-opioid treatments for Medicaid beneficiaries (2016).
3. OHA promoted statewide adoption of the CDC opioid prescribing guidelines,[24] particularly requiring prescribers to document justification for high-dose opioid prescriptions and concurrent benzodiazepines prescribing[13] (2016).

Future studies are warranted to evaluate the effect of specific policies on opioid utilization and harms, as well as assessing provider and pharmacist reactions, and attitudes around the burden of implementing such policies.

4.2 | Policy implications

Policies to reduce opioid prescriptions and harms to curb the opioid epidemic are common, but relatively understudied. There is an emerging literature suggesting rapid opioid dose reduction, dose variability, and therapy discontinuation may be associated with worse outcomes.[32] Policies with the goal of reducing access to prescription opioids, especially in a Medicaid population, which is likely to suffer from other barriers to access care,[33] should be planned and implemented carefully. It is important that restrictive policies do not create more burden on underserved populations or affect disproportionally individuals with physical or socioeconomic barriers for whom access to nonpharmacologic therapies to treat pain may be limited or non-existent.[34] Importantly, our study suggests reliance on administrative claims data may be insufficient in accurately measuring trends in opioid use, especially in the context of policy change.

4.3 | Limitations and conclusion

There are important limitations to note. While other PDMPs report payment source (insurance vs cash), the Oregon PDMP does not collect these data. We relied on a monthly differential between fills and claims, which is not as accurate as matching each claim-fill

combination. Still, we found a similar average of potential cash pay as in another study that used an approach that matched individual prescriptions.[21] Other studies have utilized the same approach.[20] It would be informing to validate our findings using data from PDMPs that capture payment source, yet our simplified approach, which compares fills/claim rates, provides a conservative estimate for potential trends in cash paid prescriptions that are less reliant on matching data anomalies associated with deterministic prescription matching. Moreover, our methodology of cash pay approximation could have resulted in overestimation because it may include third-party payment. However, the likelihood of third-party payment is low because we excluded patients with dual eligibility (ie, Medicaid and Medicare) and required a full month of enrollment as those with partial enrollment may have had other coverage types. We observed seasonal variation, particularly in, at the end of 2015 and 2016, this is likely attributed to patient behavior/preferences vs insurance coverage and is worthy of further study. Lastly, the findings of this study might not reflect the experience of patients with other types of health coverage or in other states.

In summary, up to two in 10 opioid fills were likely paid by cash by Oregon Medicaid beneficiaries in a period where several policies to limit risky opioid prescribing were in effect. This study prompts a need for conversations between public health, payers, and the healthcare community around how to balance the intended effects of policies that aim to increase patient safety and fight an epidemic and the potential unintended effects that could limit progress or cause harm.

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KEY POINTS

- The Oregon Medicaid program implemented many policies to reduce opioid harms
- We detected significant discrepancies between the Oregon Prescription Drug Monitoring Program opioid prescription dispensing and Medicaid pharmacy opioid prescription claims (more dispensed than claimed)
- Up to 2 in 10 opioid fills were likely paid by cash by Oregon Medicaid beneficiaries
- This indicates that patients may circumvent restrictive policies by paying out-of-pocket
- There is a need to balance the intended effects of policies that aim to increase patient safety and fight an epidemic and the potential unintended effects that could limit progress or cause harm.

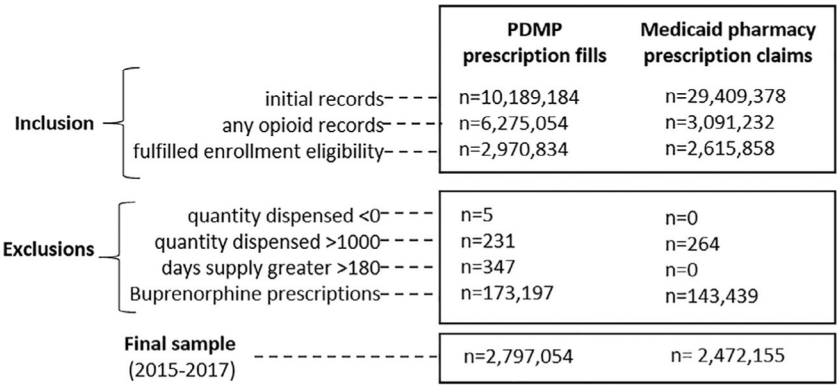

FIGURE 1.
Construction of the study sample

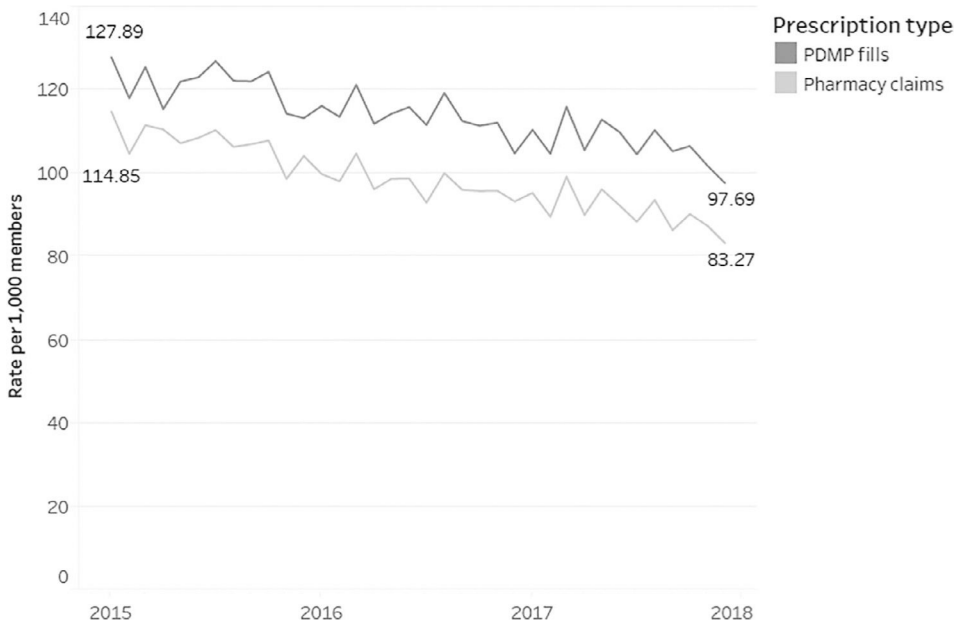

FIGURE 2.

Trends in Prescription Drug Monitoring Program (PDMP) fill rates and Medicaid pharmacy claim rates per 1000 members per month

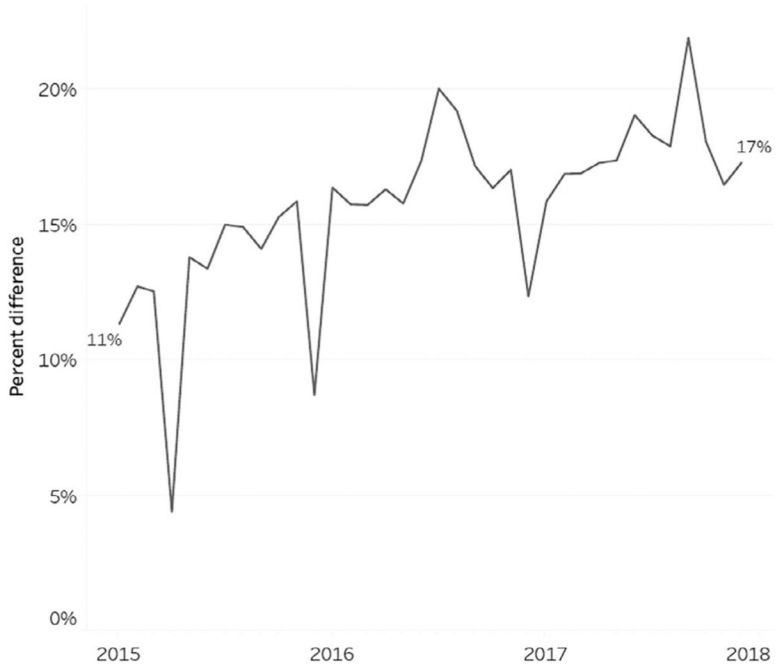

FIGURE 3.
Trend over time in percent difference in opioid fill rates to claims rates

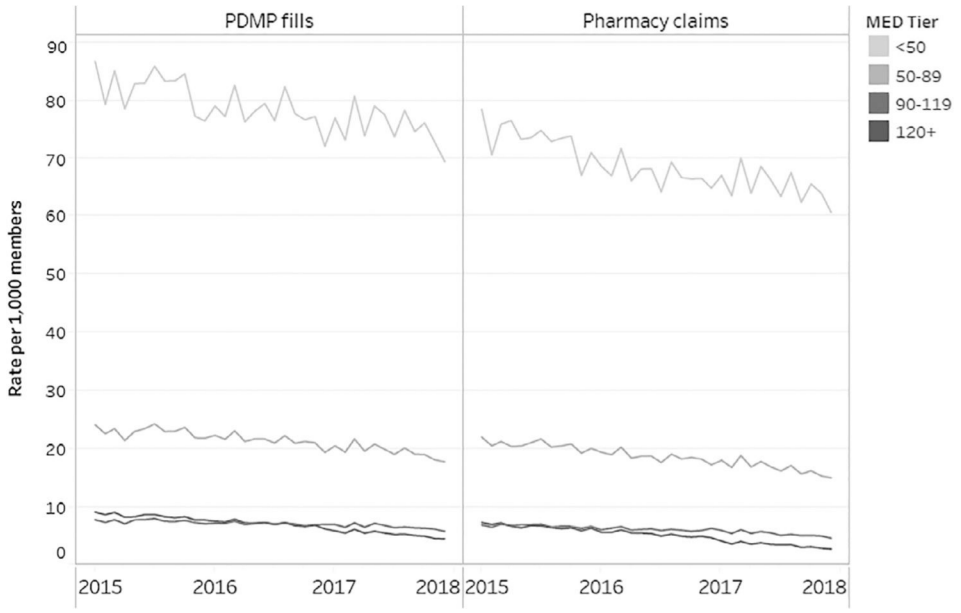

FIGURE 4.

Trend in PDMP fills rates and Medicaid pharmacy claims rates per 1000 members per month by morphine equivalent dose (MED) tiers

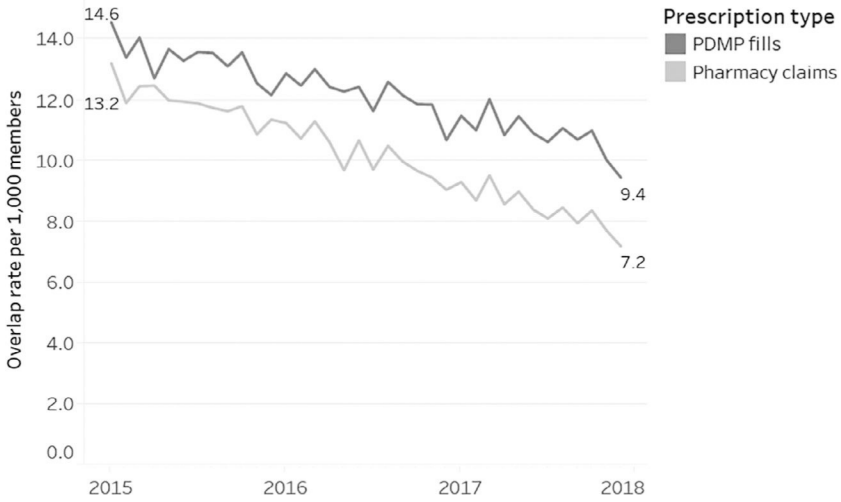

FIGURE 5.

Trends in overlapping opioid and benzodiazepine PDMP fills rates and Medicaid pharmacy claims rates per 1000 members per month

TABLE 1

Average monthly opioid prescriptions identified in Prescription Drug Monitoring Program (PDMP) vs Medicaid pharmacy claims

	PDMP fills		Medicaid pharmacy claims			Parameter estimates of fills vs claims rate	
Rate metric	**Mean (95% CL)**	***SD***	**Mean (95% CL)**	***SD***	***P* value[a]**	**(95% CL)**	***P* value[b]**
Opioid prescriptions rate per 1000 members per month	114.1 (111.6 to 116.6)	7.4	98.7 (96.0 to 101.4)	7.9	<.001	15.4 (13.6 to 17.0)	<.001
Opioid and benzodiazepine overlap rate per 1000 members per month	12.1 (12.0 to 12.5)	1.2	10.2 (9.7 to 10.7)	1.5	<.001	1.9 (1.7 to 2.1)	<.001
Rate per 1000 members per month by MED tier							
tier1 (<50 MED)	78.5 (77.1 to 80)	4.1	68.7 (67.2 to 70.1)	4.3	<.001	9.8 (8.6 to 11.1)	<.001
tier2 (50–90 MED)	21.4 (20.8 to 21.9)	1.8	18.7 (18.1 to 19.4)	1.7	<.001	2.7 (2.3 to 2.9)	<.001
tier3 (90–120 MED)	7.1 (6.9 to 7.3)	0.5	6.1 (5.9 to 6.3)	0.6	<.001	1.0 (0.9 to 1.1)	<.001
tier4 (>120 MED)	7.0 (6.5 to 7.5)	1.3	5.1 (4.7 to 5.6)	1.3	<.001	1.8 (1.7 to 1.9)	<.001

Abbreviations: CL, confidence limits; MED, morphine equivalent dose; *SD*: standard deviation.

[a]Two sample *t*-test *P* value.

[b]Generalized linear model *P* values adjusted for time.