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Opioids in Georgia Medicaid: Gender and Insurance Disparities in Utilization and Potential Inappropriate Prescribing Practices

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Abstract

Objectives—Medicaid populations have been disproportionately affected by the opioid epidemic. In Georgia, opioid deaths have increased at more than twice the rate of the nation at large. It is unknown if certain populations within the Medicaid unduly receive opioid prescriptions or experience inappropriate prescribing of opioids. Thus, this study examines gender and insurance disparities in the use of opioids and the prevalence of indicators for potential inappropriate prescribing of opioids in the Georgia Medicaid population.

Methods—Using individual Georgia Medicaid pharmacy claims data from 2012, disparities across gender (male/female) and type of insurance (fee-for-service (FFS)/managed care (MC)) were examined for the general use of opioids and potential inappropriate prescribing practices by providers. These outcome measures were taken from previous clinical guidelines and expert panels. T-tests were conducted to estimate significance in disparities across gender and type of insurance.

Key Findings—Average number of opioid prescriptions received and average days of supply of opioids were higher among males than females ($p<0.001$), and among FFS patients than MC patients ($p<0.001$). Similarly, average incidences of potential inappropriate prescribing of opioids were higher among males (1.41) than females (0.83) ($p<0.001$), and among FFS patients (1.60) than MC patients (0.46) ($p<0.001$).

Conclusions—Results indicate statistically significant disparities among male/female patients and FFS/MC patients in the general use of opioids and in potential inappropriate prescribing of opioids. Policies aimed at curbing potential inappropriate prescribing of opioids, especially among male and FFS enrollees are needed to reduce prescription drug abuse within this population.

Keywords

Opioids; inappropriate prescribing; Medicaid; fee-for-service; managed care; gender

Introduction

Prescription opioid misuse, inappropriate prescribing of opioids, and deaths from opioid overdose are a growing public health concern in the United States. The number of written prescriptions for opioid medications rose from 75.5 to 209.5 million over the past decade and deaths related to opioids tripled from 1999 to 2012 (1). From 2000 to 2014 there was a 200% increase in opioid-related overdose deaths (2). Opioid misuse, abuse and dependence account for increased healthcare utilization and associated healthcare costs. The total economic burden of prescription opioid overdose, abuse and dependence in the United States was estimated at \$78.5 billion in 2013 (3).

According to the Centers for Medicare and Medicaid Services, the opioid epidemic is disproportionately impacting Medicaid enrollees (4). Data suggest that Medicaid enrollees are more likely to be prescribed opioids and are at higher risk for prescription drug overdose compared to non-Medicaid populations (5). A study of Medicaid enrollees in 12 states found that 40% of Medicaid enrollees receiving opioid prescriptions for pain had at least one indicator of potentially inappropriate use or prescribing, defined as overlapping prescriptions of opioids, overlapping prescriptions of benzodiazepines and opioids, high daily dose of opioids (100 morphine milligram equivalents (MMEs) or greater), opioid rapid dose escalation, long-acting/extended-release (LA/ER) opioid for acute pain conditions, overlapping LA/ER prescriptions, and LA/ER prescriptions written for opioid “naïve” patients (6). Moreover, Medicaid populations have high rates of substance use disorders (SUD), a risk factor for opioid abuse and overdose (7). Research suggests that the financial cost of prescription opioid-related issues may be particularly burdensome for public healthcare payers such as state Medicaid programs (8, 9).

In Georgia, opioid-related overdose deaths are increasing at more than twice the rate of the nation at large. The prescription opioid overdose death rate per 100,000 persons in Georgia increased from 0.6 in 1999 to 6.8 in 2015, an increase of 1033%, while it increased from 1.4 to 7.0 per 100,000 persons in the U.S., an increase of 400%, during the same time period (10). To date, researchers have examined the prevalence of potentially inappropriate use and prescription of opioid analgesics in Emergency Departments,(11) among enrollees in the Truven Health MarketScan® Commercial Claims and Encounters database,(12) and among Medicaid enrollees in the MarketScan® Multi-State Medicaid database (6). Although one prior study focuses on Medicaid enrollees, it does not provide information on specific state Medicaid populations. This study focuses on utilization of opioids among Georgia Medicaid enrollees, a vulnerable population at high risk for opioid misuse, abuse and overdose.

To develop targeted policies to address the opioid epidemic, first it is important to understand the disparities in the general use of opioids and the potential inappropriate prescribing of opioids in this population. While opioid overdose death rates among males and females differ in general (higher among males), little information exists on gender disparities in the Medicaid population on their use of opioids, and inappropriate prescribing of opioids. Moreover, no information exists on disparities across insurance types in the use of opioids, or inappropriate prescribing of opioids. Information on gender and insurance disparities on the use of opioids as well as on potential inappropriate prescribing practices could provide important insights to prescribers and policy makers seeking to improve medication utilization and health outcomes in these specific sub-populations.

Thus, the objective of this study is to examine gender (male/female) and insurance (fee-for-service (FFS)/managed care (MC)) disparities both in the use of opioids and in the prevalence of indicators for potential inappropriate prescribing practices of opioids by providers in the Georgia Medicaid population. The results of this study help inform practitioners and policy makers in monitoring the usage of opioids, improving prescribing practices, improving provider-patient communications, and implementing policies that would result in reducing inappropriate prescribing practices.

Methods

Data

This study utilized individual pharmacy claims data from the Georgia Medicaid pharmacy claims database from January 2012 to December 2012. The study sample was restricted to individuals who were continuously enrolled, received an opioid prescription (short or long acting extended release opioids) during the study period, and were between the ages of 18–64. Table 1 provides the list of all opioids used by Georgia Medicaid enrollees in the analyses (13). Following previous literature, individuals with diagnoses of cancer were excluded from the study (6, 12). Cancer diagnoses were identified using International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes including 338.3, 140–172.9, 174–215.9, 217–229.10, and 235–239.9. The final study sample included 638,829 observations representing 136,589 individuals.

Measures

The outcome variables of interest in this study included indicators that identified (1) general opioid use by patients, and (2) potential inappropriate prescribing practices by providers. The outcome measures were adapted from previous clinical guidelines and expert panels (14–18).

At the individual level, indicators of general opioid use were presented by number of prescriptions received, types of prescriptions received, total days of supply of opioids, and prescriptions received by type of diagnoses. Indicators of inappropriate prescribing practices by providers were presented using five indicators that include having (1) overlapping opioid prescriptions, defined as opioid prescriptions that overlap by 7 days or more; (2) overlapping opioid and benzodiazepine prescriptions, defined as opioid and benzodiazepine prescriptions

that overlap by 7 days or more; (3) overlapping opioid and Suboxone® (buprenorphine and naloxone) prescriptions, defined as opioid and Suboxone® prescriptions that overlap by 1 day or more; (4) long-acting/extended release (LA/ER) opioids prescribed for acute pain; and (5) high daily doses of opioid prescriptions, defined as receiving more than 100 morphine milligram equivalents (MME).

Statistical Analysis

The distribution of usage of opioids, benzodiazepines, Suboxone®, and their combinations by all Georgia Medicaid enrollees who were receiving an opioid prescription during the study period were calculated. Utilization of opioids by days of supply and type of diagnoses were also analyzed. The prevalence of indicators for inappropriate prescribing practices by providers was presented as percentage of individual beneficiaries, and the analyses were stratified by gender (male/female) and type of insurance (FFS/MC). T-tests were conducted to estimate significance in disparities across gender (male/female) and type of insurance (FFS/MC). Since gender and type of insurance may also be correlated with age, we further conducted a multivariate analysis of covariance (MANCOVA) to examine the overall effect of gender and type of insurance on key dependent variables while controlling for the covariate age. All statistical analyses were conducted in Stata version 14.2 (StataCorp LP, College Station, TX).

Results

The average age of the study population was 35 years with males and females averaging at 42 years and 34 years respectively (Table 2). FFS patients (43 years) were older on average than MC patients (30 years). Among the sample population, 75.42% were female and 57.63% were enrolled in MC plans. On average, males received almost 1 more opioid prescription than females (males mean=3.97; females mean=3.08; $p<0.001$), while FFS enrollees received almost 1.5 more opioid prescriptions than MC enrollees (FFS mean=4.11; MC mean=2.64; $p<0.001$). More than one third of the sample had 3 or more opioid prescriptions (34.31%) while 42% of males versus 32.36% of females, and 42% FFS enrollees versus 28.63% MC enrollees received 3 or more opioid prescriptions. Moreover 1.29% of the sample received 20 or more prescriptions and 26 individuals received 50 or more opioid prescriptions in 2012 (data not shown).

Average days of supply of opioids were higher among males (63.53) compared with females (38.07) ($p<0.001$), and among FFS patients (64.88) compared with MC patients (27.15) ($p<0.001$). Approximately 73% of the sample individuals received less than 30 total days of supply of opioids; 59.75% of males versus 75.80% of females and 60.48% FFS patients versus 81.43% MC patients received less than 30 total days of supply of opioids. Almost 14% of the sample individuals received more than 90 days of supply of opioids. Moreover 7.81% of males and 4.12% of females, and 8% of FFS patients and 2.57% MC patients received 200–364 total days of supply of opioids. In addition, 744 (2.69%) males and 1,468 (1.35%) females, and 1,737 (3%) FFS patients and 475 (0.6%) MC patients, totaling 1.62% of the sample, received more than 365 days of supply of opioids (data not shown). Among the study sample 22% received a benzodiazepine prescription while 0.3% of the sample

received a Suboxone® prescription. A higher proportion of males (21.43%) than females (19.68%) and a higher proportion of FFS patients (25.55%) than MC patients (15.98%) received both an opioid and a benzodiazepine prescription, totaling 20% of the study population.

Table 3 presents diagnoses associated with the opioid prescriptions received by the study sample. Among the study sample 24% had a diagnosis of chronic pain only while 8.53% of the sample had an acute pain only diagnosis. A larger percentage of males than females had a diagnosis of either acute pain or chronic pain only. However, a larger percentage of MC patients than FFS patients had acute pain only diagnosis while a larger percentage of FFS patients than MC patients had a chronic pain only diagnosis. The study sample had very few individuals (0.12%) with a diagnosis of opioid use disorders (OUD) only. About 21% of the sample had diagnoses of both acute and chronic pain conditions, with a higher percentage of males (28.05%) than females (18.97%), and higher percentage of FFS patients (25.77%) than MC patients (17.16%) experiencing these diagnoses. About 46% of the sample had other diagnoses (diagnoses other than acute pain, chronic pain, OUD, or any combinations of them).

As for indicators of potential inappropriate prescribing practices by providers, about 6% of the sample received opioid/opioid overlapping prescriptions, 11.37% of the sample received opioid/benzodiazepine overlapping prescriptions, 0.12% of the sample received opioid/Suboxone® overlapping prescriptions, 2.87% of the sample received high daily doses, and 0.97% of the sample received LA/ER prescriptions for acute pain (Table 4). Results also indicate that a higher percentage of males (9.53%) than females (5.2%) and a higher percentage of FFS patients (9.76%) than MC patients (3.37%) received opioid/opioid overlapping prescriptions. A higher percentage of males (14.67%) than females (10.54%) also received opioid/benzodiazepine overlapping prescriptions. FFS patients (16.91%) received opioid/benzodiazepine overlapping prescriptions at more than twice the rate of MC patients (7.3%). Similarly, males (1.96%) received LA/ER opioid prescriptions for acute pain at more than twice the rate of females (0.71%), while FFS patients (1.84%) received them at more than five times the rate of MC patients (0.32%). Moreover, high daily doses of opioid prescriptions were received by males (4.84%) at a rate that was more than twice the rate of females (2.37%), and by FFS patients (4.19%) at a rate that was more than twice the rate of MC patients (1.9%).

Overall, about 16% of the sample individuals experienced 1 or more incidences of indicators of potential inappropriate prescribing practices by providers, with a higher proportion of males (22.18%) experiencing more incidences than females (14.45%). FFS patients (23.49%) experienced more than twice the rate of incidences than MC patients (10.52%) in the sample. In addition, 5.81% of the sample experienced 5 or more incidences while 3.07% of the sample experienced 10 or more incidences of potential inappropriate prescribing practices by providers. A higher proportion of males than females in the sample experienced both 5 or more incidences and 10 or more incidences. The proportion of FFS patients (4.08%) experiencing 5 or more incidences was more than twice the rate of MC patients (1.75%), while it was four times greater for 10 or more incidences (5.49% versus 1.29% respectively). Average incidences of potential inappropriate prescribing practices by

providers were higher among males (1.41) in comparison with females (0.83) ($p<0.001$), and among FFS patients (1.6) in comparison with MC patients (0.46) ($p<0.001$). The average for FFS patients was more than three times the average for MC patients.

Since both gender and insurance type are likely to be correlated with age, we also carried out a multivariate analysis of covariance (MANCOVA) to examine the overall effect of gender and insurance type on key dependent variables (total days supply of opioids, total number of incidences of inappropriate prescribing practices), while controlling for the covariate age. Multivariate test indicated age ($F=5498.87$, $p<0.001$) as a significant covariate affecting the dependent variables. The MANCOVA results indicated that after controlling for the effects of the covariate age, there was a significant multivariate main effect of gender ($F=103.74$, $p<0.001$) and insurance type ($F=66.86$, $p<0.001$) on the dependent variables. The interaction between gender and insurance type also had significant negative effect on the dependent variables ($F=21.16$, $p<0.001$), indicating that females with managed care insurance are less likely to experience inappropriate incidences and higher average days-supply of opioids compared with their counterparts.

Discussion

Given the high level of attention and scrutiny associated with the prescribing of opioids the finding that most opioid prescriptions in Georgia fall under appropriate and accepted prescribing practices is reassuring. Yet, there were a substantial number of individuals with opioid prescriptions that had characteristics that substantially elevated their risk of adverse health outcomes. This was evidenced by the fact that about one in six individuals in the study experienced one or more incidences of potential inappropriate prescribing practices. In addition, nearly half (45.72%) of the opioid use in this population was for conditions other than acute (9%) or chronic pain (24%) with an additional 20.80% of patients receiving opioids for both acute and chronic pain diagnoses. The relatively lower use of opioids for acute pain is encouraging given current recommendations with respect to the use of opioids for this diagnosis (19).

The study findings also indicated that males and FFS patients were receiving higher number of opioid, benzodiazepine, and LA/ER opioid prescriptions as well as experiencing higher average days of supply of opioids in comparison with females and MC patients respectively. In Georgia, patients can select either FFS or MC for their Medicaid coverage. While most patients choose MC, patients who do not make an election are automatically assigned to FFS which is demographically comprised of older and sicker patients. While older and poorer populations tend to be sicker in general, there may be other factors which explain higher utilization of opioids among FFS patients and males in this population. MC formulary policies and prescribing protocols can also be more restrictive than FFS, limiting opioid utilization in MC. Previous literature also indicates misuse and abuse of opioids to be more prevalent among males than females, which might also explain higher utilization of opioids among males in this population (20). While poor health conditions and restrictive formulary policies might explain some of these variations in opioid utilization, there might be other reasons such as demographic variations, socioeconomic differences, or selection (bias) into certain health insurance plans that may account for these outcomes.

Similarly, males and FFS patients experienced higher levels of opioid/opioid and opioid/benzodiazepine overlapping prescriptions, LA/ER prescriptions for acute pain, and high daily doses of opioids in comparison with females and MC patients respectively. While the finding of higher prevalence of opioid/opioid overlap among males is consistent with previous research on Medicaid populations, the findings on opioid/benzodiazepine overlap contrast with prior research (6). It is also possible that the origins of pain (disease processes) in males differ from females and require more extensive treatment. Males may also delay seeking care longer than females, causing more difficulty for prescribers (e.g., pain is more severe and therefore difficult to treat) once care is finally sought. In addition, like opioid utilization, the fact that older and sicker people are more likely to be in FFS than MC and the restrictive nature of MC formularies may also help explain the high incidence rate of inappropriate prescribing practices among FFS Medicaid patients in Georgia.

The indicators of inappropriate prescribing practices examined in this study have been linked to opioid related adverse health outcomes such as increased healthcare utilization, increased emergency department visits, and overdose deaths (21–23). The first step in reducing negative health outcomes in patients who must use opioids is to thoroughly understand the problem. Efforts are underway nationwide to reduce morbidity and mortality associated with opioid use. However, efforts aimed at this goal must be sensitive to legitimate patient needs related to relief of pain. For example, opioid use associated with the treatment of work-related injuries should be optimized to avoid untoward outcomes such as long-term disability and improve pain management (24). These efforts may bolster workforce and labor productivity among Medicaid populations in states such as Georgia.

It should also be recognized that in some cases there may be medical reasons why certain drug dosages and combinations of opioids are prescribed even when it is known that the dose or combination of medications could place patients at increased risk. However, even with this in mind, there are clearly opportunities to improve medication use in patients using opioids. Strategies to reduce potential inappropriate prescribing might begin, as this study does, by alerting prescribers and policy makers to the numbers and types of patients for which opioid medication use may not be optimal.

Results from this study also indicate an opportunity to improve physicians' prescribing practices. Current educational efforts such as the CDC's Opioid Prescribing Guidelines have been created to provide evidence-based guidance regarding appropriate opioid use in clinical practice (25). Professional organizations also have made an effort to reduce the negative outcomes stemming from inappropriate opioid prescribing through educational means. For example, the American Medical Association created a Task Force to Reduce Opioid Abuse which has assembled educational resources to bolster appropriate prescribing for pain management, reduce prescription opioid-related harm and combat drug diversion. In addition, researchers are now developing interventions to improve opioid prescribing. Recently, Leece et al. created an intervention based on implementation science and behavior change theory to increase adherence to the Canadian Opioid Guideline among family physicians (26). McCracken et al. pilot tested training experiences aimed at improving appropriate opioid prescribing (27). Future research should continue to develop and evaluate the impact of educational efforts on physician prescribing practices.

Limitations

While this study has several strengths such as examining disparities in inappropriate prescribing of opioids across gender and insurance types, and providing a detail analysis of opioid use among the Medicaid population in Georgia, it has several limitations. First, pharmacy claims data shows only filled prescriptions, not actual consumption, which may vary from the prescriptions received. Thus the results should be interpreted with caution. In addition, this study focuses only on Georgia Medicaid population aged 18–64. Therefore, the results may not be generalizable to the entire Medicaid population. Further, this is a cross-sectional study from year 2012 and is descriptive in nature. While Medicaid claims data from 2012 was chosen for the study due to its availability, to our knowledge this is the first study to examine opioid usage in Georgia Medicaid population. Finally, using ICD-9-CM codes to identify diagnoses has its own limitations since type of pain may not be classified properly or reported accurately.

Conclusions and Policy Implications

The presence of potential inappropriate prescribing practices in this study population highlights the need for attention to developing and evaluation of policies aimed at improving the prescribing of these medications. Creating and implementing policies designed to curb potential inappropriate prescribing practices of opioids may improve adverse health outcomes and reduce opioid use disorder within the Medicaid population(4). Efforts aimed at reducing opioid use disorder may include patient and prescriber education, more effective use of prescription drug monitoring programs, increased access to naloxone, appropriate treatment referral for patients with OUDs, and strategies to reduce the supply of illicit opioids. Strategies to reduce the supply of opioids could include, for example, prescribing and dispensing limitations by payers and the rescheduling of hydrocodone products to Schedule II (which was done in 2014) in an attempt to curb use and limit supply. Better identification of patients at risk for opioid use disorder, education of stakeholders (e.g., policy makers, prescribers, and patients) and improved access to the rescue medications such as naloxone will be critical to improving outcomes for patients who must use opioids.

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Table 1

List of Opioid Analgesics, Opioid Drug Classification, and Morphine Equivalent Conversion Factors per Milligram^a

Opioid Analgesic (strength in mg except where noted)	Morphine Milligram Equivalent (MME) Conversion Factor
Short Acting	
Butorphanol	7
Codeine phosphate + acetaminophen or aspirin	0.15
Codeine sulfate	0.15
Dihydrocodeine + acetaminophen or aspirin	0.25
Fentanyl, buccal/SL tablet or lozenge/troche (MCG)	0.13
Fentanyl, film/oral spray (MCG)	0.18
Hydrocodone + acetaminophen, ibuprofen or homatropine	1
Hydromorphone	4
Levorphanol tartrate	11
Meperidine hydrochloride (with or without promethazine)	0.1
Morphine sulfate	1
Opium	1
Oxycodone (with or without aspirin, acetaminophen, ibuprofen)	1.5
Oxymorphone	3
Pentazocine (with or without acetaminophen or aspirin)	0.37
Tapentadol	0.4
Tramadol (with or without acetaminophen)	0.1
Long-acting/extended release	
Fentanyl, transdermal patch extended-release (MCG/HR)	7.2
Methadone	3
Morphine sulfate sustained-release/extended-release	1
Oxycodone hydrochloride controlled-release	1.5
Oxymorphone extended-release	3
Tramadol extended-release	0.1

^a Adapted from National Center for Injury Prevention and Control at the Centers for Disease Control and Prevention, Atlanta, GA (2016).

Table 2

Demographic Characteristics and General Opioid Use Indicators of the study Sample by gender and insurance type

	Male (n=27,641)		Female (n=108,948)		FFS (n=57,873)		MC (n=78,716)		Total (n=136,589)	
	No.	%	No.	%	No.	%	No.	%	No.	%
Age (Number of Individuals)										
18–34	9,364	33.88	67,672	62.11	18,896	32.65	59,059	75.03	77,036	56.40
35–44	5,049	18.27	19,045	17.48	9,123	15.76	14,739	18.72	24,094	17.64
45–54	6,470	23.41	12,324	11.31	14,743	25.47	4,257	5.41	18,794	13.76
55–65	6,690	24.20	9,735	8.94	15,111	26.11	661	0.84	16,425	12.03
Mean (SD)	41.55 (14.09)		33.63 (12.07)		42.91 (13.87)		29.6 (8.51)		35.24 (12.90)	
P value (95% Confidence Interval)										
p <0.001; (7.75–8.08)										
Medication Use										
Number of Any Opioid Rx Obtained										
1	11,320	40.95	52,669	48.34	22,881	39.54	41,108	52.22	63,989	46.85
2	4,713	17.05	21,029	19.30	10,669	18.44	15,073	19.15	25,742	18.85
3 to 6	6,506	23.54	22,526	20.68	13,187	22.79	15,845	20.13	29,032	21.26
7 or more	5,102	18.46	12,724	11.68	11,136	19.24	6,690	8.50	17,826	13.05
Mean (SD)	3.97 (4.82)		3.08 (3.91)		4.11 (5.05)		2.64 (3.15)		3.26 (4.13)	
P value (95% Confidence Interval)										
p <0.001; (0.84–0.95)										
Number of (SA) Opioid Rx obtained										
0	510	1.85	714	0.66	893	1.54	331	0.42	1,224	0.90
1	11,449	41.42	52,826	48.49	23,100	39.91	41,175	52.31	64,275	47.06
2	4,705	17.02	21,067	19.34	10,691	18.47	15,081	19.16	25,772	18.87
3 to 6	6,449	23.33	22,455	20.61	13,142	22.71	15,762	20.02	28,904	21.16
7 or more	4,528	16.38	11,886	10.91	10,047	17.36	6,367	8.09	16,414	12.02
Mean (SD)	3.62 (4.33)		2.95 (3.68)		3.78 (4.60)		2.57 (3.04)		3.08 (3.83)	
P value (95% Confidence Interval)										
p <0.001; (0.61–0.72)										
Number of LA/ER Opioid Rx obtained										
p <0.001; (1.17–1.25)										

	Male (n=27,641)		Female (n=108,948)		FFS (n=57,873)		MC (n=78,716)		Total (n=136,589)	
	No.	%	No.	%	No.	%	No.	%	No.	%
0	25,954	93.90	106,353	97.62	54,669	94.46	77,638	98.63	132,307	96.87
1	430	1.56	693	0.64	786	1.36	337	0.43	1,123	0.82
2	178	0.64	347	0.32	381	0.66	144	0.18	525	0.38
3 to 6	458	1.66	689	0.63	836	1.44	311	0.40	1,147	0.84
7 or more	621	2.25	866	0.79	1,201	2.08	286	0.36	1,487	1.09
Mean (SD)	0.36 (1.88)		0.13 (1.10)		0.33 (1.80)		0.06 (0.74)		0.17 (1.30)	
P value (95% Confidence Interval)	p<0.001; (0.21–0.25)		p<0.001; (0.25–0.28)							
Number of Benzodiazepine Rx obtained										
0	20,670	74.78	85,585	78.56	40,994	70.83	65,261	82.91	106,255	77.79
1	1,523	5.51	6,151	5.65	3,620	6.26	4,054	5.15	7,674	5.62
2	772	2.79	2,653	2.44	1,722	2.98	1,703	2.16	3,425	2.51
3 to 6	1,662	6.01	5,479	5.03	3,715	6.42	3,426	4.35	7,141	5.23
7 or more	3,014	10.90	9,080	8.33	7,822	13.52	4,272	5.43	12,094	8.85
Mean (SD)	1.69 (4.11)		1.32 (3.64)		2.09 (4.61)		0.89 (2.84)		1.40 (3.74)	
P value (95% Confidence Interval)	p<0.001; (0.32–0.42)		p<0.001; (1.15–1.23)							
Number of Suboxone Rx obtained										
0	27,563	99.72	108,610	99.69	57,766	99.82	78,407	99.61	136,173	99.70
1	20	0.07	71	0.07	30	0.05	61	0.08	91	0.07
2	13	0.05	45	0.04	16	0.03	42	0.05	58	0.04
3 to 6	23	0.08	110	0.10	31	0.05	102	0.13	133	0.10
7 or more	22	0.08	112	0.10	30	0.05	104	0.13	134	0.10
Mean (SD)	0.02 (0.42)		0.02 (0.47)		0.01 (0.38)		0.02 (0.51)		0.02 (0.46)	
P value (95% Confidence Interval)	p=0.43; (–0.01–0.004)		p<0.001; (–0.02–(–0.01))							
Types of Rx obtained in 2012										
Opioid only	19,964	72.23	84,611	77.66	39,793	68.76	64,782	82.30	104,575	76.56
Opioid and Benzodiazepine only	5,924	21.43	21,443	19.68	14,786	25.55	12,581	15.98	27,367	20.04
Any Opioid and Benzodiazepine only	6,971	25.22	23,363	21.44	16,879	29.17	13,455	17.09	30,334	22.21

	Male (n=27,641)		Female (n=108,948)		FFS (n=57,873)		MC (n=78,716)		Total (n=136,589)	
	No.	%	No.	%	No.	%	No.	%	No.	%
Opioid and Suboxone only	29	0.10	114	0.10	27	0.05	116	0.15	143	0.10
Opioid and LA/ER only	463	1.68	600	0.55	830	1.43	233	0.30	1,063	0.78
LA/ER and Suboxone	1	0.00	3	0.00	1	0.00	3	0.00	4	0.00
Opioid, Benzodiazepine and Suboxone	37	0.13	185	0.17	63	0.11	159	0.20	222	0.16
Total Days of Supply of opioids per patient										
<30	16,515	59.75	82,584	75.80	35,000	60.48	64,099	81.43	99,099	72.55
30–59	3,420	12.37	9,289	8.53	7,080	12.23	5,629	7.15	12,709	9.30
60–89	1,721	6.23	4,075	3.74	3,451	5.96	2,345	2.98	5,796	4.24
90+	5,985	21.65	13,000	11.93	12,673	21.90	6,312	8.02	18,985	13.90
Mean (SD)	63.53 (107.04)		38.07 (80.86)		64.88 (110.12)		27.15 (60.83)		43.23 (87.40)	
P value (95% Confidence Interval)	p<0.001; (24.31–26.61)		p<0.001; (36.82–38.65)							

Note: n= number of observations; FFS – fee-for-service; MC – Managed Care; SD – standard deviation; LA/ER – long acting extended release opioids

Table 3

Opioid Prescriptions across Diagnoses by gender and insurance type

Reasons for Opioid Use	Male (n=27,641)		Female (n=108,948)		FFS (n=57,873)		MC (n=78,716)		Total (n=136,589)	
	No.	%	No.	%	No.	%	No.	%	No.	%
Acute pain only	2,827	10.23	8,821	8.10	4,324	7.47	7,324	9.30	11,648	8.53
Chronic pain only	8,108	29.33	24,391	22.39	17,771	30.71	14,728	18.71	32,499	23.79
Opioid Use Disorders (OUD) only	34	0.12	134	0.12	57	0.10	111	0.14	168	0.12
Both acute and chronic pain conditions only	7,752	28.05	20,663	18.97	14,911	25.77	13,504	17.16	28,415	20.80
Acute pain, Chronic pain and OUD conditions	237	0.86	525	0.48	449	0.78	313	0.40	762	0.56
Acute pain and OUD only	13	0.05	45	0.04	20,013	34.58	42,437	53.91	58	0.04
Chronic pain and OUD only	178	0.64	411	0.38	21	0.04	37	0.05	589	0.43
Other diagnoses	8,492	30.72	53,958	49.53	327	0.57	262	0.33	62,450	45.72

Note: FFS – fee-for-service; MC – Managed Care

Table 4
Indicators of Potential Misuse and Inappropriate Prescribing Practices by gender and insurance type

Indicator	Male (n=27,641)		Female (n=108,948)		FFS (n=57,873)		MC (n=78,716)		Total (n=136,589)	
	No.	%	No.	%	No.	%	No.	%	No.	%
Opioid/Opioid Overlap										
None	25,007	90.47	103,279	94.80	52,226	90.24	76,060	96.63	128,286	93.92
Once	1,312	4.75	3,023	2.77	2,747	4.75	1,588	2.02	4,335	3.17
Less than ten incidence (1<x<10)	1,147	4.15	2,318	2.13	2,480	4.29	985	1.25	3,465	2.54
Ten or more incidents	175	0.63	328	0.30	420	0.73	83	0.11	503	0.37
Range (0–47)										6.08
Opioid/Benzodiazepine Overlap										
None	23,585	85.33	97,468	89.46	48,087	83.09	72,966	92.70	121,053	88.63
Once	1,055	3.82	3,174	2.91	2,458	4.25	1,771	2.25	4,229	3.10
Less than ten incidence (1<x<10)	2,215	8.01	6,171	5.66	5,153	8.90	3,233	4.11	8,386	6.14
Ten or more incidents	786	2.84	2,135	1.96	2,175	3.76	746	0.95	2,921	2.14
Range (0–58)										11.37
Opioid/Suboxone Overlap										
None	27,614	99.90	108,808	99.87	57,820	99.91	78,602	99.86	136,422	99.88
Once	13	0.05	68	0.06	22	0.04	59	0.07	81	0.06
Two or more	14	0.05	72	0.07	31	0.05	55	0.07	86	0.06
Range (0–12)										0.12
LA/ER prescribed for acute pain										
None	27,099	98.04	108,170	99.29	56,806	98.16	78,463	99.68	135,269	99.03
Once	286	1.03	456	0.42	572	0.99	170	0.22	742	0.54
Less than ten incidence (1<x<10)	239	0.86	299	0.27	456	0.79	82	0.10	538	0.39
Ten or more incidents	17	0.06	23	0.02	39	0.07	1	0.00	40	0.03
Range (0–26)										0.97
High Daily Opioid Dosage (>100MMEs)										
None	26,302	95.16	106,369	97.63	55,449	95.81	77,222	98.10	132,671	97.13

Indicator	Male (n=27,641)		Female (n=108,948)		FFS (n=57,873)		MC (n=78,716)		Total (n=136,589)	
	No.	%	No.	%	No.	%	No.	%	No.	%
Once	497	1.80	1,432	1.31	893	1.54	1,036	1.32	1,929	1.41
Less than ten incidence (1<x<10)	555	2.01	778	0.71	983	1.70	350	0.44	1,333	0.98
Ten or more incidents	287	1.04	369	0.34	548	0.95	108	0.14	656	0.48
Range (0–56)										2.87
Number of Indicators										
None	21,510	77.82	93,202	85.55	44,276	76.51	70,436	89.48	114,712	83.98
One	1,924	6.96	5,491	5.04	4,067	7.03	3,348	4.25	7,415	5.43
Less than five incidence (1<x<5)	1,898	6.87	4,631	4.25	3,990	6.89	2,539	3.23	6,529	4.78
Five or more but less than ten (5<=x<10)	1,032	3.73	2,708	2.49	2,362	4.08	1,378	1.75	3,740	2.74
Ten or more incidents	1,277	4.62	2,916	2.68	3,178	5.49	1,015	1.29	4,193	3.07
Total (n & %) of individuals with indicators	6,131	22.18	15,746	14.45	13,597	23.49	8,280	10.52	21,877	16.02
Mean (SD)	1.41 (4.87)		0.83 (3.55)		1.60 (5.19)		0.46 (2.34)		0.94 (3.86)	
Range (0–114)										
P value	<0.001		<0.001		<0.001		<0.001		<0.001	
95% Confidence Interval	(0.53–0.63)		(0.53–0.63)		(1.09–1.17)		(1.09–1.17)		(1.09–1.17)	

Note: FFS – fee-for-service; MC – Managed Care; SD – standard deviation; LA/ER – long acting extended release opioids; MME – Morphine milligram equivalent