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Trends in Long-term Opioid Therapy for Non-Cancer Pain among Persons with a History of Depression

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Abstract

Objective—We report trends in long-term opioid use among patients from two large health plans with a history of depression.

Methods—Using claims data, age and gender-adjusted rates for long-term (>90 days) opioid use episodes were calculated for 1997–2005, comparing those with and without a depression diagnosis in the prior two years. Opioid use characteristics were calculated for those with a long-term episode in 2005.

Results—Incident and prevalent long-term opioid use rates were three times higher in those with a history of depression. Prevalent long-term use per 1,000 in patients with a history of depression increased from 69.8 to 125.9 at Group Health, and from 84.3 to 117.5 at Kaiser Permanente of Northern California between 1997 and 2005. Those with a history of depression were more likely to receive a higher average daily dose, greater days supply, and Schedule II opioids than non-depressed persons.

Conclusion—Persons with a history of depression are more likely to receive long-term opioid therapy for non-cancer pain than those without a history of depression. Results suggest that long-term opioid therapy for non-cancer pain is being prescribed to a different population in clinical practice than the clinical trial populations where opioid efficacy has been established.

Keywords

opioid; pain; depression; pharmacoepidemiology

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INTRODUCTION

Prescription opioids have become a common treatment strategy for chronic non-cancer pain over the past two decades. Prescribing rates increased from 8 to 16% of all outpatient visits for musculoskeletal pain between 1980 and 2000 [1], and the prevalence of primary care physician visits in which opioids were prescribed increased from 41 per 1000 total visits in 1992–1993 to 59 per 1000 in 2000–2001 [2]. Rates of opioid use have continued to increase throughout the U.S. since 2000 (D Boudreau, Ph.D., unpublished data, March, 2008) [3]. Despite increased rates of use, data are lacking on the efficacy and safety of longer-term opioid use for non-cancer pain, particularly in patients with major depression or substance abuse, who have generally been excluded from randomized opioid trials [4]. In a recent meta-analysis of randomized trials of opioid treatment for noncancer pain, the mean length of these trials was 5 weeks and the longest trial was 16 weeks [5]. The presence of a comorbid depressive disorder is common among individuals with chronic non-cancer pain [6–8]. Prevalence rates have been reported to range from 3–28% in population-based samples [7–10], as high as 46% in primary care patients with chronic pain [11] and as high as 100% in patients seen in pain specialty clinics [11]. Individuals with non-cancer pain and depression report greater severity of both mental and physical symptoms [6,12,13], and may be more likely to be prescribed opioids [14–16]. These individuals, however, may also be at greater risk of prescription opioid abuse [17,18]. An understanding of opioid prescribing patterns in these patients, therefore, is important in order to better inform future clinical research and policy decisions.

CONSORT (CONsortium to Study Opioid Risks and Trends) was developed to improve understanding of trends in, and risks of, long-term opioid therapy for chronic non-cancer pain in community practice, and uses automated data from two health plans providing comprehensive health care to over one-percent of the U.S. population. In this study, we report trends and characteristics of long-term opioid therapy among patients with a depression diagnosis in a health care contact in the previous two years. Our primary objective was to describe and contrast trends in incident and prevalent long-term opioid use among individuals based on the presence of a depression diagnosis in the prior two years. A secondary objective was to present a profile of long-term opioid use, describing and contrasting use characteristics (e.g. dose, days supply) among individuals based on the presence of a depression diagnosis in the prior two years for the most recent year of data (2005).

METHODS

Data Source

Data were obtained from automated health plan records for Group Health Cooperative (GH) in Washington State and Kaiser Permanente of Northern California (KPNC) for the period January 1, 1997 through December 31, 2005. Data for opioid use was tracked through 2006. Both health plans serve employed persons, older populations enrolled in Medicare and lower income persons insured by Medicaid and State health insurance programs for low income populations. The health plans offer primary care as well as specialty services. The demographics of the health plan populations are similar to their respective regions; there are fewer African-Americans in Western Washington and Northern California than in the U.S. population as a whole, but more Asians and Pacific Islanders. Kaiser Permanente's membership includes 6% African-Americans, 12% Hispanics, and 17% Asian/Pacific Islanders, whereas Group Health includes 3% African-Americans, 2% Hispanics, and 4% Asian/Pacific Islanders. Both health plans maintain automated pharmacy and medical encounter data for all covered services, including services provided directly by the health plans and services rendered by other providers who bill the health plans. Surveys at both health plans have consistently found that more than 90% of enrollees obtain almost all of their prescription medications through health plan pharmacies [19,20]. The study population for each year included adults age 18 years and

older enrolled for the year of interest and 182 days following the end of the calendar year. Individuals with a diagnosis of cancer at any time during the study period were excluded from analyses as determined from the Cancer Surveillance and End Results (SEER) registries at both health plans. CONSORT research plans were reviewed and approved by the Institutional Review Boards of both health plans. Additional details of the study design and methods can be found elsewhere [21].

Opioid Use Episodes

Opioid use was defined using an episode-based approach. Incident use included episodes beginning in the study year of interest, and prevalent use included episodes on-going in the year of interest. The beginning of an episode was defined by receipt of a prescription for an orally or transdermally administered opioid where no prior opioid prescription had been filled in the previous six months. The last fill of an episode was defined as the last opioid dispensed with no subsequent opioid dispensings in the following six months. The start date of an episode was the date the first opioid in the episode was dispensed, and the end date was the date the medication should have run out after this last dispensing based on the days supply. Long-term episodes were defined as those lasting 90 days or longer (difference in days between the date the initial prescription was dispensed and the run-out date of the last prescription dispensed plus one) and that had greater than 120 days supply dispensed or more than 10 prescriptions filled. This definition was based on life table analyses showing that the probability of another 10 days supply and an additional prescription being dispensed was high when there had been greater than 120 days supply or more than 10 prescriptions dispensed [21].

Sociodemographic and Clinical Variables

Sociodemographic information and clinical diagnoses were obtained from automated health plan records. Enrollees were identified as depressed if they received a diagnosis of depression (based on ICD-9 codes 296.2x, 296.3x, 311, 300.4) at a health care visit in either of the two calendar years preceding the year in which the opioid use episode began. Pain diagnoses were identified for those who had a visit with a prescribing doctor in the two weeks prior to the 2005 incident long-term opioid use episode start date. If there was more than one visit in the two weeks prior to the episode start date, the visit closest to the first dispensing was used. Data on pain diagnoses were limited to internal network providers because visits could not be matched to prescriptions by provider for out-of-network providers. Pain diagnoses were classified into the following categories based on ICD-9 codes: Back pain, neck pain, temporomandibular pain, osteoarthritis, headache, extremity pain, abdominal pain/hernia, chest pain, kidney stones/gall stones, menstrual/genital/reproductive pain (females), rheumatoid arthritis, fractures/contusions/injury, neuropathies excluding alcoholic, drug-related or optic, other pain (ICD-9 codes 78652; 72885; 7030; 7291; 7062; 3829; 38022; 5259; 5225; 470; 8488; 38870; 38181; 60490; 5224; 8489; 8483; 61179; 725; 5651; 61171; 9964; 87363; 37991; 56942; 38023).

Statistical Analyses

Opioid Use Trends—For each study year (1997–2005), we calculated the age and gender adjusted rates of opioid use per 1,000 individuals, stratified by presence of depression in the prior two years. Because complete data were not available for years prior to 1997 at KPNC, rates for this health plan were limited to the years 1999–2005. We directly standardized rates to the 2005 population using 10 groups (gender and age categorized as: 18–34, 35–44, 45–64, 65–74, and 75+). Standardization corrects for differing age distributions in different populations, thus allowing valid comparisons of rates. In direct standardization, two or more populations to be compared (e.g., enrollees from different years) are given the same age distribution, which is then applied to the observed age-specific rate in each population. We estimated the percent change annualized with 95% confidence intervals for age-sex

standardized opioid use rates using the linearized method described by Fay and colleagues [22]. The percent change annualized estimates the annual rate of change over a fixed time period, where rates are assumed to change at a constant percentage of the rate of the previous year.

Sociodemographic and Clinical Variables—Sociodemographic variables and pain diagnoses for enrollees with an incident long-term opioid use episode in 2005 were analyzed descriptively using frequencies and percents for categorical variables and means with standard deviations for continuous variables, stratified by presence of a depression diagnosis in the prior two years.

Opioid Use Characteristics—We created medication profiles for depressed and non-depressed enrollees who were prevalent long-term opioid users in 2005, calculating the average daily dose during the episode, the prescribed dose and days supply, and the proportions with high dose opioid use, predominant opioid class used, and greater than 180 days supply of sedative hypnotic use in the same year. Profiles for prevalent long-term users included persons with a long-term opioid episode ongoing in 2005 (e.g., did not begin in 2005) and covered the calendar year 2005. To compare whether differences noted were specific to 2005 or present in other years as well, we also created medication profiles for depressed and non-depressed enrollees who were long-term opioid users in 1999.

Morphine equivalents for each prescription were calculated by multiplying the quantity of the prescription by the strength (milligrams per unit dispensed), and multiplying this total by a conversion factor [21]. Average daily opioid dose was calculated as the total morphine equivalents for an episode divided by episode duration in days. Average prescribed dose was calculated as the total morphine equivalents for an episode divided by total days supply for the episode. Higher dose episodes were defined as those with an average daily dose of 20mg morphine equivalents or greater. This threshold was selected empirically because the large majority of patients received lower average daily doses. In sensitivity analysis, we alternatively defined the higher dose threshold at 50mg and 100mg morphine equivalents per day. The predominant opioid class used (e.g., mainly Schedule II) was defined as the opioid with the longest total days supply during the 365 days under study.

RESULTS

Opioid Use Trends

Tables 1 and 2 present age and sex-adjusted rates of incident (Table 1) and prevalent (Table 2) long-term opioid use per 1,000 persons, for Group Health (GH) (1997–2005) and Kaiser Permanente Northern California (KPNC) (1999–2005) enrollees, stratified by presence of a depression diagnosis in the prior two years (“depressed” versus “non-depressed”). The decline in rates of long-term incident opioid use from 2004 to 2005 is likely due to the shorter time period available for identifying episodes which began in 2005 than episodes beginning in earlier years. Rates were approximately two to four times higher in depressed persons compared to non-depressed persons in the earliest year under study, and increased similarly over time. Prevalent long-term opioid use increased more rapidly over time than incident long-term opioid use. Annualized rates of change did not differ significantly between the depressed and non-depressed groups in GH, and were slightly higher in the non-depressed enrollees at KPNC.

Sociodemographic and Clinical Characteristics (Table 3)

The mean age of incident long-term opioid users in 2005 was 55 years among depressed, and 58 years among non-depressed, in both GH and Kaiser KPNC. Approximately 72% of depressed and 56% of non-depressed persons were female. The most common diagnoses

received at the index visit with the prescriber occurring within two weeks prior to the episode start date, were back pain, extremity pain and osteoarthritis.

Opioid Use Characteristics

Tables 4 and 5 present opioid use characteristics among depressed and non-depressed GH and KPNC enrollees with prevalent long-term opioid use at the beginning of 2005 (prevalent episodes). Depressed persons had a higher average daily dose and days supply, and were more likely to receive mainly Schedule II opioids. They were also more likely to have concurrent sedative-hypnotic use with 180 or greater days supply in 2005. A larger percentage of depressed persons were receiving a higher dose regimen (≥20mg morphine equivalents per day) of opioids per day compared to non-depressed persons. This was also true for those with prevalent episodes of long-term opioid use if higher dose was defined as ≥50mg morphine equivalents per day or ≥100mg morphine equivalents per day (Table 5). Dose, days supply and percent with mainly any and long-acting schedule II opioids were lower among enrollees with prevalent long-term opioid use episodes in1999, similar differences were present between depressed and non-depressed persons (i.e. greater use in depressed; data not shown).

DISCUSSION

This study found that patients in two large health plans in the Western United States who had received a depression diagnosis in the prior two years had approximately three-fold higher rates of incident and prevalent long-term opioid therapy for non-cancer pain compared to patients without a prior health care contact for depression. In addition, persons with a recent history of depression and with long-term opioid use were more likely to receive higher daily doses, greater days supply, more potent Schedule II opioids, and were more likely to have concurrent use of sedative-hypnotic medications than persons without a history of depression. Our data suggest that those with a recent history of depression are more likely to both initiate and continue opioid therapy for non-cancer pain relative to those without a history of depression. While rates of both incident and prevalent long-term opioid use were higher among those with versus those without a recent history of depression over the entire study period, the annual rate of change was similar in the two groups, suggesting that the increase in long-term opioid use observed over the study period reflects a more general trend towards increased opioid use not specific to depressed persons. However, because those with a recent history of depression started from higher baseline rates, the absolute change in the rates of long-term opioid use was greater among this group. The difference between those with versus without a history of depression was greater when examining rates of prevalent long-term use than rates of incident long-term use. Depression may affect prevalence more because it increases both opioid initiation and continuation.

These results are consistent with findings from the population-based Healthcare for Communities survey, demonstrating that respondents with common mental disorders in 1998 or 2001 (major depression, dysthymia, generalized anxiety disorder, or panic disorder) were more likely to report regular prescription opioid use in 2001 than those without any of these disorders [15,16]. Our results are also consistent with those of a similar study that found higher rates of opioid use for non-cancer pain conditions among enrollees with mental disorders in commercially insured and state Medicaid plans[23]. These data suggest that long-term opioid therapy for non-cancer pain is being prescribed to a different population in clinical practice than the clinical trial populations where opioid efficacy has been established. Individuals with significant mental health disorders, including severe depression and substance abuse are often excluded from clinical trials due to concerns about retention and adherence. Given the high degree of comorbidity between depression and chronic pain, studies of opioid effectiveness

and safety in this population are needed in order to determine the risks, benefits and most appropriate combinations of treatment in this subpopulation of individuals with chronic pain.

It is not possible from these data to ascertain the reasons for the greater use of opioids among depressed patients in our study; however there are several possibilities, based on what is known about depression and chronic pain. Depression is a common co-morbid condition among individuals with chronic pain[11]. Prior studies suggest that persons with depression report more physical and psychological symptoms [24], and function more poorly than those without depression [25]. Prior studies have also found higher pain interference and mental distress among those with comorbid non-cancer pain and depression [6–8,12,26]. It is possible opioids prescribed to depressed persons may be treating an undifferentiated state of mental and physical pain. Depressed persons may be more likely to request opioids or providers more likely to provide opioids based on observed or reported distress. It is also possible that depressed persons have more severe pain not responsive to first-line therapies. Some studies also suggest depression accompanied by high levels of pain may be more difficult to treat than depression with lower levels or no pain, highlighting the challenges of managing these conditions when they are comorbid [27,28]. At the minimum, however, these results support a recommendation for providers to screen their patients on longer-term opioid therapy for depression, and treat or refer to specialty mental health care as appropriate.

It is beyond the scope of this study to determine whether or not the observed rates of long-term opioid use are appropriate. It is worth noting, however, that individuals with depression represent a potentially high-risk group for adverse outcomes of opioid use. Individuals with depression are at increased risk of having a comorbid alcohol or drug use disorder compared to those without depression [29]; and a history of a substance use disorder has been consistently found to be associated with prescription opioid misuse or abuse [17,18,30]. In this study, more than one-third of prevalent long-term opioid users with depression had also received 180 days or greater supply of sedative-hypnotics in 2005. Insomnia and anxiety are common in depression, and may be treated with benzodiazepines or other sedative-hypnotics. Both sedative-hypnotics and opioids are central nervous system depressants, and their combination - particularly if taken with alcohol or other sedating drugs – can increase risk for sedation and overdose. At present, there is limited data on the outcomes of long-term opioid therapy in this population [31]. Given how commonly depression co-occurs with non-cancer pain and opioid use, this is an area deserving further study.

There are several limitations to our study. Individuals were defined as depressed based on a diagnosis documented for a health care contact. Cases of depression are missed if not identified and documented by a health care provider. In addition, depression diagnoses likely represent a broad range of severity. Less severe depression is most likely to be missed [32]. Because data presented in this paper were based largely on automated pharmacy data, no information on pain severity, severity of psychological distress, or functional status were available to characterize outcomes, and information on opioids actually taken by patients was not available. Given that the presence of comorbid depression has been associated with greater pain severity and interference, persons defined as depressed in our study may represent individuals with more disabling pain. In addition, no information on socio-economic status or race was available, characteristics that have been shown in prior studies to be associated with opioid use and chronic pain[15,16]. Persons defined as depressed in our study may also have additional comorbid conditions that influence their likelihood of receiving opioids. We were unable to reliably assess comorbidity, however, because documentation in the medical record is dependent on how many diagnoses the provider decides to code for the particular visit and the diagnostic skills of the provider. Both participating health plans were integrated health care delivery systems with prepaid, capitated insurance plans. We are likely capturing the majority of medication dispensed, but prescribing patterns may differ from those of fee-for-service

physicians and pharmacies that are not part of the same delivery system. The participating plans in this study also have pharmacy policies that actively influence physician prescribing. Health plan pharmacists review physician prescribing in both settings, both health plans have formularies and evidence review procedures for determining which medications are placed on the formulary, and access of pharmaceutical sales representatives to physicians is more restricted in both plans than in fee-for-service settings. Additionally, both plans are located in the Western United States, and results may not be generalizable to care provided in other regions of the country.

In summary, results of our study show higher rates of long-term opioid use, and greater opioid dose, potency, and days supply among health plan enrollees with depression compared to those without depression. Baseline rates were three times higher in those with depression, but increased at a similar rate in depressed and non-depressed throughout the follow-up period. Future studies are indicated to assess the efficacy, safety and risks of long-term opioid therapy in individuals with non-cancer pain and depression.

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Table 1

Age-Sex Adjusted Rates per 1,000 of **Incident Long-Term Opioid Use**[a] by Year among Adult Non-Cancer Subjects Enrolled in Group Health and Kaiser Permanente Northern California

		Group Health		
		Depressed[b]		**Non-Depressed**
Year	**N**	**Rate per 1,000 (95% CI)**	**N**	**Rate per 1,000 (95% CI)**
1997	18197	20.6 (18.4–23.1)	175018	7.6 (7.2–8.1)
1998	19559	19.0 (17.0–21.2)	174746	7.4 (7.0–7.9)
1999	20210	20.9 (18.8–23.1)	183700	7.0 (6.6–7.4)
2000	20651	21.2 (19.1–23.4)	185979	8.0 (7.6–8.5)
2001	21874	21.4 (19.4–23.6)	185674	8.5 (8.0–8.9)
2002	23484	22.7 (20.7–24.8)	181631	8.9 (8.5–9.3)
2003	25224	24.6 (22.7–26.8)	174786	9.4 (8.9–9.8)
2004	27195	27.0 (25.0–29.1)	177830	10.1 (9.6–10.6)
2005	26994	24.9 (22.9–26.9)	173848	9.3 (8.8–9.8)
% change annualized[c]		3.7 (2.5–4.9)		4.1 (3.4–4.7)
		Kaiser Permanente Northern California		
		Depressed[b]		**Non-Depressed**
Year	N	Rate per 1,000 (95% CI)	N	Rate per 1,000 (95% CI)
1999	88415	19.3 (18.3–20.3)	1162219	6.2 (6.0–6.3)
2000	96285	19.7 (18.8–20.7)	1192154	6.7 (6.5–6.8)
2001	105106	20.5 (19.6–21.4)	1213450	7.2 (7.0–7.3)
2002	115549	22.9 (22.0–23.9)	1223930	8.0 (7.8–8.1)
2003	127548	22.8 (21.9–23.7)	1244344	8.3 (8.1–8.5)
2004	142181	23.0 (22.2–23.9)	1283251	8.4 (8.2–8.6)
2005	150020	20.5 (19.7–21.3)	1311474	7.1 (7.0–7.3)
% change annualized[c]		2.2 (1.4–3.0)		3.8 (3.4–4.2)

[a] Opioid use episodes beginning in the year of interest, defined by an initial dispensing for oral or transdermal opioid with no dispensing of opioids in prior six months. Long term use defined as episodes with duration of 90+ days, 10+ fills or days supply of fills 120+ days.

[b] Depressed defined as having a documented depression diagnosis in either of the two prior calendar years

[c] Percent change annualized with 95%confidence intervals for age-sex standardized opioid use rates using the linearized method described by Fay and colleagues.[26] The linearized PCA estimates the constant annual rate of change over a fixed time period.

Table 2

Age-Sex Adjusted Rates per 1,000 of **Prevalent Long-Term Opioid Use**[a] by Year Among Adult Non-Cancer Subjects Enrolled in Group Health and Kaiser Permanente Northern California

		Group Health		
Year	**N**	**Depressed[b] Rate per 1,000 (95% CI)**	**N**	**Non-Depressed Rate per 1,000 (95% CI)**
1997	18197	69.8 (65.7–74.0)	175018	22.7 (21.9–23.4)
1998	19559	76.8 (72.7–81.0)	174746	24.8 (24.0–25.6)
1999	20210	86.7 (82.5–91.2)	183700	25.5 (24.7–26.2)
2000	20651	91.0 (86.8–95.5)	185979	27.5 (26.7–28.3)
2001	21874	95.3 (91.1–99.7)	185674	29.5 (28.7–30.3)
2002	23484	99.5 (95.4–103.9)	181631	31.3 (30.4–32.1)
2003	25224	107.9 (103.7–112.3)	174786	33.0 (32.1–33.8)
2004	27195	117.3 (113.1–121.6)	177830	35.6 (34.7–36.4)
2005	26994	125.9 (121.6–130.4)	173848	37.8 (36.9–38.7)
% change annualized[c]		7.2 (6.6–7.8)		6.5 (6.1–6.9)
		Kaiser Permanente Northern California		
		Depressed[b]		**Non-Depressed**
Year	N	Rate per 1,000 (95% CI)	N	Rate per 1,000 (95% CI)
1999	88415	84.3 (82.3–86.3)	1162219	22.8 (22.5–23.1)
2000	96285	88.8 (86.9–90.8)	1192154	24.6 (24.3–24.9)
2001	105106	94.3 (92.4–96.3)	1213450	26.4 (26.2–26.7)
2002	115549	100.4 (98.5–102.3)	1223930	28.6 (28.2–28.9)
2003	127548	107.2 (105.3–109.1)	1244344	30.7 (30.4–31.1)
2004	142181	113.0 (111.2–114.9)	1283251	32.9 (32.6–33.2)
2005	150020	117.5 (115.7–119.3)	1311474	33.2 (32.9–33.5)
% change annualized[c]		5.9 (5.5–6.3)		6.9 (6.7–7.1)

[a] Opioid use episodes ongoing in the year of interest. Long term use defined as episodes with duration of 90+ days, 10+ fills or days supply of fills 120+ days.

[b] Depressed defined as having a documented depression diagnosis in either of the two prior calendar years

[c] Percent change annualized with 95%confidence intervals for age-sex standardized opioid use rates using the linearized method described by Fay and colleagues.[26] The linearized PCA estimates the constant annual rate of change over a fixed time period.

Table 3

Characteristics of Adult Non-Cancer Subjects Enrolled in Group Health and Kaiser Permanente and Initiating Long-Term Opioid Use During 2005

Characteristic	Group Health			Kaiser Permanente – Northern California		
	Depressed[a] (N=520)	Non-Depressed (N=1256)	P value	Depressed[a] (N=3200)	Non-Depressed (N=9317)	P value
Age, mean (SD)	55.1 (17.1)	58.4 (16.5)	<0.001	55.4 (15.6)	58.4 (16.2)	<0.001
Gender, N (%) female	491 (72.3%)	895 (55.5%)	<0.001	2298 (71.8%)	5257 (56.4%)	<0.001
Pain types[b], N (%)						
Any pain	295 (76.4%)	753 (81.9%)	0.02	1442 (71.6%)	4374 (73.5%)	0.09
Back pain	96 (24.9%)	290 (31.6%)	0.02	525 (26.1%)	1605 (27.0%)	0.41
Extremity pain	83 (21.5%)	231 (25.1%)	0.16	411 (20.4%)	1314 (22.1%)	0.11
Osteoarthritis	44 (11.4%)	114 (12.4%)	0.61	161 (8.0%)	721 (12.1%)	<0.001
Neck pain	17 (4.4%)	45 (4.9%)	0.70	113 (5.6%)	293 (4.9%)	0.23
Fractures, contusion, or injury	28 (7.3%)	57 (6.2%)	0.48	117 (5.8%)	289 (4.9%)	0.10
Headache	16 (4.2%)	30 (3.3%)	0.43	112 (5.6%)	174 (2.9%)	<0.001
Abdominal pain	16 (4.2%)	35 (3.8%)	0.77	95 (4.7%)	205 (3.5%)	0.01
Menstrual pain	9 (2.3%)	6 (0.7%)	0.01	21 (1.0%)	33 (0.6%)	0.03
Chest pain	4 (1.0%)	8 (0.9%)	0.77	32 (1.6%)	90 (1.5%)	0.81
Rheumatoid arthritis	2 (0.5%)	16 (1.7%)	0.08	25 (1.2%)	67 (1.1%)	0.68
Neuropathy	2 (0.5%)	17 (1.9%)	0.07	50 (2.5%)	156 (2.6%)	0.73
Temporomandibular pain	1 (0.3%)	1 (0.1%)	0.53	9 (0.5%)	9 (0.2%)	0.02
Kidney/gallstones	0	9 (1.0%)	0.05	9 (0.5%)	44 (0.7%)	0.14
Other pain	26 (6.7%)	47 (5.1%)	0.24	128 (6.4%)	290 (4.9%)	0.01

[a] Depressed defined as having a documented depression diagnosis in either of the two prior calendar years

[b] Among those with an index visit (919 [74.2%] of depressed and 386 [73.2%] of non-depressed in GH, 2015 [63.0%] of depressed and 5948 [63.8%] of non-depressed in KPNC); Index visit defined as visit w/prescribing doctor in 2 weeks prior to episode start date. Visit closest to 1st dispensing was used if more than 1 visit in 2 weeks prior to episode start

Table 4

Profiles of Opioid Use Among Persons With **Prevalent** Episodes of Long-Term Opioid Use During 2005[a] at Group Health and Kaiser Permanente Northern California

	Group Health			Kaiser Permanente Northern California		
	Depressed[b] (N=2,124)	**Non-Depressed (N=3,431)**	**P value**	**Depressed[b] (N=11,307)**	**Non-Depressed (N=21,881)**	**P value**
Average Prescribed Dose (mg)[c]	54.1	44.5	<0.001	65.4	48.0	<0.001
Average Daily Dose (mg)[d]	53.3	39.6	<0.001	62.8	39.6	<0.001
Average Days Supply	304.4	284.3	<0.001	304.5	273.8	<0.001
Percent with Mainly Schedule II[e]	49.3%	43.4%	<0.001	25.6%	13.7%	<0.001
Percent with Mainly Long-Acting Schedule II	28.9%	21.0%	<0.001	19.9%	9.5%	<0.001
Percent with 180+ Days Supply Sedative-Hypnotics	35.6%	24.1%	<0.001	41.0%	24.2%	<0.001

[a] Long-term opioid use episodes on-going in 2005. Long term use defined as episodes with duration of 90+ days, 10+ fills or days supply of fills 120+ days.

[b] Depressed defined as having a documented depression diagnosis in either of the two prior calendar years

[c] Average prescribed dose is the total morphine equivalents for an episode divided by total days supply for the episode, that is, the estimated average daily dose prescribed as opposed to the average daily dose consumed.

[d] Average daily dose is the total morphine equivalents for an episode divided by episode duration in days.

[e] Schedule II=morphine sulfate; codeine sulfate; hydromorphone;, meperidine; fentanyl transmucosal; and oxymorphone, oxycodone, morphine sulfate SR; fentanyl transdermal; levorphanol; oxycodone CR; and methadone, hydromorphone SR, oxymorphone SR

Table 5

Average Daily Opioid Dose [a] Among Persons With **Prevalent** Episodes of Long-Term Opioid Use During 2005[b] at Group Health and Kaiser Permanente Northern California

	Group Health			Kaiser Permanente Northern California		
	Depressed[c] (N=2,124)	**Non-Depressed (N=3,431)**	**P value**	**Depressed[c] (N=11,307)**	**Non-Depressed (N=21,881)**	**P value**
Percent with Average Daily Dose						
≥20 mg morphine equivalents	50.7%	41.3%	<0.001	57.9%	44.3%	<0.001
≥50 mg morphine equivalents	26.3%	19.4%	<0.001	28.9%	17.4%	<0.001
≥100 mg morphine equivalents	12.2%	8.7%	<0.001	14.8%	7.0%	<0.001

[a] Average daily dose is the total morphine equivalents for an episode divided by episode duration in days.

[b] Long-term opioid use episodes on-going in 2005. Long term use defined as episodes with duration of 90+ days, 10+ fills or days supply of fills 120+ days.

[c] Depressed defined as having a documented depression diagnosis in either of the two prior calendar years