Published in final edited form as:
Clin J Pain. 2008 ; 24(6): 521–527. doi:10.1097/AJP.0b013e318169d03b.

Defacto Long-term Opioid Therapy for Non-Cancer Pain

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Abstract

Objectives—This paper describes characteristics of opioid use episodes for non-cancer pain and defines thresholds for the transition into Defacto Long-term Opioid Therapy.

Methods—CONSORT (CONsortium to Study Opioid Risks and Trends) includes adult members of two health plans serving over one-percent of the U.S. population. Opioid use episodes beginning in 1997–2005 were classified as Acute, Episodic, Long-term/Lower Dose, or Long-term/Higher Dose.

Results—Defacto Long-term Opioid Therapy was defined by opioid use episodes lasting longer than 90 days with at least 10 prescriptions and/or at least 120 days supply dispensed. Long-term/Higher Dose episodes (<1.5% of all episodes) were characterized by daily or near daily use, a mean duration of about 1000 days, and an average daily dose of about 55 milligrams. They accounted for more than half the total morphine equivalents dispensed from 1997–2006. Short-acting, less potent opioids (e.g. hydrocodone with acetaminophen) were by far the most commonly prescribed medications for acute, episodic and long-term episodes. Long-acting (sustained-release) opioids were the predominately prescribed medication in a minority of long-term episodes (6–12%).

Discussion—Defacto Long-term Opioid Therapy was characterized by considerable diversity in medications, dosage, and frequency of use. Long-term opioid therapy may evolve from acute or episodic use in the absence of an agreed upon treatment plan. Defined thresholds for Defacto Long-term Opioid Therapy provide a possible check point for physicians and health plans to ensure that patients receiving opioid medications long-term are managed according to a treatment plan that is documented and monitored.

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Keywords

Opioids; Epidemiology; Chronic Pain; Methods; Episodes

Millions of Americans now receive opioid therapy for chronic non-cancer pain [1], but little is known about the duration or other characteristics of opioid use episodes for chronic non-cancer pain. Societal and personal risks of increased prescribing of opioid analgesics, (e.g. abuse, diversion, accidental injury, adverse health effects) need to be weighed against potential benefits [2–7]. This is particularly true for the minority of patients who elect to continue use of opioids over long periods of time. Unfortunately, neither risks nor benefits of long-term opioid therapy are well understood [8]. Randomized trials have been too small and too short, typically lasting no more than 12 weeks [9–12]. No large observational cohort studies have assessed the safety of long-term opioid use under community practice, or "real-world" conditions. Thus, large numbers of Americans are now exposed to long-term opioid therapy in the absence of adequate understanding of how opioids are used and the potential risks of adverse outcomes. In community practice, it is unclear to what extent long-term opioid therapy is pre-planned and monitored [8] in accord with expert guidelines [13]. We define Defacto Long-term Opioid Therapy as extended use of opioids for chronic non-cancer pain whether explicitly pre-planned or not. Defacto long-term opioid therapy may often evolve through patient self-selection in the absence of an agreed upon treatment plan or monitoring by the prescribing physician(s).

With support from the National Institute of Drug Abuse, 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. CONSORT data are intended to provide new information regarding trends in how opioid medications are used under community practice conditions, and to evaluate associated risks. The objectives of this paper are to provide an overview of CONSORT methods used to characterize and classify opioid use episodes, to define thresholds for transition into defacto long-term opioid therapy, and to describe the characteristics of long-term opioid use episodes in two large health plan populations over a ten year study period.

MATERIALS AND METHODS

Setting and participants—CONSORT was initiated to study use of opioids for non-cancer pain among adults age 18+ in Group Health Cooperative (located in Washington State) and Kaiser Permanente of Northern California over a ten year period (1997–2006). The two health plans serve about four million persons--over one-percent of the U.S. population. CONSORT research plans were reviewed and approved by the Institutional Review Boards of both health plans.

The demographics of Group Health and Kaiser Permanente are similar to those of their respective regions [14,15]. 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's includes 3% African-Americans, 2% Hispanics, and 4% Asian/Pacific Islanders. The populations of both health plans are similar in terms of educational attainment and household income to their regional populations. Both health plans serve older populations enrolled in Medicare and lower income persons insured by Medicaid and State health insurance programs for low income populations.

Data Sources

Automated pharmacy and medical encounter data—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. The pharmacy files contain one record per drug dispensed including generic drug name, strength, directions for use, date dispensed, quantity dispensed, days supply, prescriber identification number, and National Drug Code. Kaiser Permanente and Group Health pharmacies are conveniently located in relation to clinics. 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 [14,15].

Defining Episodes of Opioid Use—CONSORT data on opioid use were developed using an episode approach. The beginning of an episode of opioid use was defined by a prescription for an orally or transdermally administered opioid with no prior prescription filled in the prior six months. The start date of an episode is the date the first opioid in the episode was dispensed. The last fill of an episode is defined as the last opioid dispensed with no subsequent opioid dispensings in the following six months. The end date of the episode is the date the medication should have run out after this last dispensing based on the days supply field. More than 3,000,000 new episodes of opioid use were identified from January 1, 1997 through December 31, 2005 at the two health plans, of which almost 150,000 were long-term. Opioid use was tracked until the end of 2006. All cancer patients were eliminated from CONSORT analyses by excluding persons who had received a diagnosis of cancer in the year the episode began or prior to that year. Cancer status was determined from the Cancer Surveillance and End Results (SEER) Registries available at both health plans. This method excludes patients with a history of cancer who may have been using opioids for non-cancer pain as well as patients using opioids for cancer pain.

Indication—Indication for prescription was not available on pharmacy records. At Group Health in 2001–2003 we determined indication through ICD-9 codes recorded on visit encounters to the prescribing physician that occurred within 90 days of the initial prescription (N=151,314 episodes of opioid use). It was possible to link a preceding encounter within 90 days to an initial opioid prescription for 74.4% of the episodes. The most common diagnostic groups observed on the linked encounters were: extremity pain (13.4%); back pain (13.3%); fractures, contusions, injury (7.1%); abdominal pain/hernia (5.1%); osteoarthritis (3.8%); neck pain (3.6 %); headache (2.6 %); kidney stones/gall stones (1.9%); and menstrual/reproductive pain (1.0%).

Classification of opioids—Opioids were classified into three major groups: long-acting (Schedule II) opioids; short-acting, more potent (Schedule II) opioids; and short-acting, less potent opioids. The types of opioid medications within each group are listed in Table 1, along with conversion factors for estimating morphine equivalent dosages from the milligrams of each type of opioid dispensed. The conversion factors were based on information from multiple sources [16–20]. After reviewing published conversion factors, consensus was reached among two physicians with clinical experience in pain management (MS and JM), and a pharmacist pharmacoepidemiologist (DB).

Total Morphine Equivalents—Total Morphine Equivalents for a single prescription was calculated by multiplying the quantity of each prescription by the strength of the prescription (milligrams of opioid per unit dispensed). The quantity × strength product was then multiplied by the conversion factor for morphine equivalents (see Table 1) to estimate the morphine equivalents for the prescription. Total Morphine Equivalents in an episode was

calculated by adding the morphine equivalents for each prescription dispensed during the episode.

Episode Duration and Days Supply—Episode Duration is the difference (in days) between the date the initial prescription was dispensed and the run-out date of the last prescription dispensed plus one. Total Days Supply is the sum of Days Supply for each opioid dispensed during an episode. Days Supply may not represent the intended days supply of a particular prescription as it is usually calculated by pharmacists using the maximum dose and frequency permitted within the range specified by the prescribing provider. Therefore Total Days Supply tends to underestimate the actual days supply dispensed.

Average Daily Dose and Average Prescribed Dose—Average Daily Dose is the Total Morphine Equivalents for an episode divided by Episode Duration in days. 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.

Type of episode—Based on exploratory analyses to refine criteria for classifying episodes, each episode of opioid use was classified as Acute, Episodic, Long-term/Lower Dose, or Long-term/Higher Dose. Episodes lasting less than 90 days were classified as Acute. Episodes lasting 90 days or longer were classified as episodic if the total days supply was less than 120 and the total number of prescriptions filled was fewer than 10. Episodes that lasted longer than 90 days that had 120 or more total days supply or 10 or more prescriptions filled were classified as long-term opioid use. These thresholds provide an operational definition for Defacto Long-term Opioid Therapy. Long-term episodes were considered higher dose if the average daily dose was 20 mg morphine equivalents or greater, whereas episodes with less than 20 mg morphine equivalents were classified as lower dose. The empirical bases for these classification criteria are discussed in the Results section.

Most frequently prescribed opioid—The opioid with the largest Total Days Supply in an episode was identified as the most frequently prescribed opioid in that episode. In case of ties, the opioid with the larger Average Prescribed Dose was identified.

Data quality issues—We treated as an outlier any value for Days Supply or quantity dispensed that was greater than two times the 99^{th} percentile value for a particular type of opioid. Outliers were then handled following procedures for other forms of missing data. If either quantity or Days Supply was missing for a particular prescription, then Morphine Equivalents were not calculated for that prescription. The estimate of Total Morphine Equivalents was inflated by the total number of prescriptions in the episode (including those with missing data) divided by the number of prescriptions with valid data (i.e. not counting the ones with missing/outlier data). This approach conservatively estimates Total Morphine Equivalents for prescriptions with missing/outlier data as being equal to the average prescription in the episode. If more than one-tenth of the prescriptions in an episode had missing/outlier data, then the entire episode was set to missing. At both Group Health and Kaiser Permanente, Total Morphine Equivalents was set to missing for less than one percent of all episodes.

Analyses—We present data on the most frequently prescribed type of opioid by the four episode types. We also present a profile of each type of episode (mean values of Episode Duration, Total Days Supply, Average Daily Dose, and Average Prescribed Dose). The

percent of Total Days Supply and the percent of Total Morphine Equivalents dispensed over the ten year study period accounted for by each type of episode were also determined.

Evaluation of episode classification criteria—Initially using Group Health data, we assessed the criteria for classifying Defacto Long-term Opioid Therapy episodes by their association with future level of opioid use. Using 1997–98 data, we identified and classified new opioid use episodes starting in 1997 for adult enrollees who remained enrolled from 1997 through year-end 2000. We then determined level of opioid use in 1999–2000. Persons with multiple episodes in 1997 or in 1999 were assigned to the highest level episode. We report the percent of persons who met criteria for Defacto Long-term Opioid Therapy in 1999–2000 among persons with higher dose and lower dose long-term opioid use episodes in 1997–1998. We then replicated these analyses using Kaiser Permanente data.

RESULTS

Evaluation of episode classification criteria

Among persons initiating a new episode of Defacto Long-term Opioid Therapy in 1997–98 at Group Health Cooperative, 56.1% of those meeting criteria for higher dose therapy continued to meet criteria for Defacto Long-term Opioid Therapy in 1999–2000. Among persons receiving long-term opioid therapy at lower dosage levels in 1997–98, 46.3% continued to meet criteria for Defacto Long-term Opioid Therapy in 1999–2000. The corresponding percentages at Kaiser Permanente Northern California were 68.4% and 68.3%. Among persons meeting criteria for Defacto Long-Term Opioid Therapy in 1997–98, the percentage continuing either episodic or long-term use in 1999–2000 was 62.2% at Group Health and 74.1% at Kaiser Permanente Northern California. Thus, persons who surpassed the proposed threshold for Defacto Long-term Opioid Therapy (i.e. an episode lasting at least 90 days, with at least 10 prescriptions and/or 120 days supply of opioids dispensed) were highly likely to continue frequent use of opioids in future years.

Opioids prescribed—As shown in Table 2, for all types of episodes starting in 1997–2005, the most frequently prescribed opioids were short-acting, less potent opioids. Short-acting, less potent opioids were also the most frequently prescribed opioid for long-term episodes. Hydrocodone with aspirin/acetaminophen was the most commonly prescribed opioid overall. It was also the most frequently prescribed opioid for long-term episodes, followed by codeine with aspirin/acetaminophen and propoxyphene.

A notable difference in prescribing patterns was observed between the two health plans. At Group Health, short-acting less potent opioids were the most frequently prescribed for 74% of all episodes and for 65% of long-term episodes. At Kaiser Permanente, short-acting, less potent opioids were the most frequently prescribed medication for 98% of all episodes and for 91% of long-term episodes At Group Health, short-acting more potent (Schedule II) opioids were the most frequently prescribed drug for about one-fifth of all episodes and an equal proportion of long-term episodes. Oxycodone was the most commonly prescribed short-acting Schedule II opioid. In contrast, at Kaiser Permanente, short-acting, more potent opioids were the most frequently prescribed medication for only 1.7% of all episodes and for 3.4% of the long-term episodes.

Long-acting opioids were the most frequently prescribed medication for 1.5% of all episodes at Group Health and 0.4% of all episodes at Kaiser Permanente. Among long-term episodes, long-acting opioids were the most frequently prescribed medication for 12.4% of episodes at Group Health and 5.7% at Kaiser Permanente. At both health plans, the most commonly prescribed long-acting opioid for long-term episodes was sustained release morphine.

Profiles of opioid use by episode type

The profiles of opioid use in Table 3 shows mean differences in opioid use patterns across the four types of episodes. Despite differences in prescribing of more potent short-acting and long-acting opioids between Group Health and Kaiser Permanente, the episode profiles were similar for the two health plans. By definition, acute episodes were typically brief (12–14 days on average), with a limited Days Supply of opioids dispensed (7–9 days on average). The Average Prescribed Dose for acute episodes was somewhat greater at Kaiser Permanente (55 mg) than at Group Health (32 mg). Acute episodes represented 80–82% of the opioid use episodes initiated from 1997–2005, but these episodes accounted for only 18–19% of the Total Days Supply dispensed and 12–16% of the Total Morphine Equivalents' dispensed over the ten year study period.

Episodic use of opioids lasted, on average, about half a year, with a mean of 28–29 Total Days Supply dispensed over the course of the episode. While the Average Prescribed Dose was similar to that of acute episodes, the Average Daily Dose was substantially lower (5–6 mg), likely reflecting intermittent use. Episodic use accounted for 13–14% of all opioid use episodes from 1997–2005, and a somewhat smaller percentage of the Total Days Supply of opioids and of Total Morphine Equivalents dispensed over the ten year study period.

Persons with Long-term, Lower-dose Episodes continued to use opioids for about 850 days on average, but the mean Total Days Supply during these episodes was for less than half the number of days in the episodes. From available data, it is difficult to determine the extent to which Long-Term, Lower Dose episodes comprised low-dose daily use versus intermittent use. The low Average Daily Dose (8–9 mg morphine equivalents) likely reflects both patients who use small amounts of opioids on a regular basis and patients who use opioids intermittently. The Average Prescribed Dose (24–30 mg) was also low. Long-term/Lower Dose use accounted for 3–4% of all opioid use episodes initiated during 1997–2005.

The remaining opioid use episodes (less than 1.5% of all episodes) were Long-term/Higher Dose episodes. These episodes continued for an average of about 1000 days, and patients received an average of about 850 Total Days Supply during the episode, reflecting daily or near daily use. The Average Prescribed Dose for these episodes was about 60–70 mg morphine equivalents, while the Average Daily Dose was about 50–60 mg morphine equivalents. While Long-term/Higher Dose episodes accounted for about 1.5 percent of all episodes initiated in 1997–2005, these episodes accounted for 54–63% of the Total Morphine Equivalents dispensed over the ten year study period.

DISCUSSION

We developed a simple, empirically-based classification of opioid use episodes, dividing them into acute, episodic and long-term episodes, with the long-term episodes sub-divided into lower and higher dose episodes. Defacto Long-term Opioid Therapy was operationally defined by an episode of use lasting at least 90 days with at least 10 prescriptions and/or 120 days supply of opioids dispensed in the episode. Descriptive analyses showed that acute episodes comprised about 80% of all opioid use episodes, but long-term, higher dose episodes (comprising <1.5% of all episodes) accounted for well over half of the Total Morphine Equivalents dispensed over the ten year study period. Our analyses showed that long-term lower dose opioid use was more common than long-term daily or near daily use at higher dosage levels. Long-term, lower dose episodes include both regular opioid use at low dosage levels and intermittent opioid use. Short-acting, less potent opioids were by far the most commonly prescribed medications for all types of episodes.

The profiles of Acute, Episodic, Long-term/Lower Dose, and Long-term/Higher Dose episodes were generally similar across the two health plans. A limitation of this study is that both participating health plans were integrated health care delivery systems with prepaid, capitated insurance plans (i.e., services were not provided on a fee-for-service basis). Prescribing patterns may differ from those of fee-for-service physicians and pharmacies that are not part of the same delivery system. With those caveats in mind, a parallel study of opioid prescribing patterns underway in a large network model health plan has also observed that less potent opioids are the most commonly prescribed and that long-acting opioids are relatively infrequently prescribed in long-term episodes [Mark Sullivan, personal communication]. The participating plans in this study have medical cultures and 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. Access of pharmaceutical sales representatives to physicians is more restricted in both plans than in fee-for-service settings. These similarities may tend to reduce variability in prescribing patterns. Even so, notable differences in prescribing of Schedule II opioids were observed between Group Health and Kaiser Permanente of Northern California. Until California State law changed at the end of 2004, California required triplicate prescribing forms for Schedule II opioids, which likely explains this difference. The State of Washington required triplicate prescribing forms only in conjunction with a disciplinary program. Triplicate form requirements have been shown to substantially reduce the prescribing of Schedule II opioids [21].

The American Academy of Pain Medicine and American Pain Society guidelines for long-term opioid therapy advocate therapy being initiated after thorough evaluation of the patient, development of a treatment plan, followed by periodic review of efficacy and progress toward agreed upon treatment goals [13]. Long-term opioid therapy is envisioned as being based on daily use sufficient to keep chronic pain at tolerable levels, and contingent upon progress in pain control and functional recovery. It is unknown to what extent Defact Long-term Opioid Therapy in the health plans participating in this study, or in community practice generally, is consistent with these guidelines. CONSORT data do not provide a basis for determining whether Defacto Long-term Opioid Therapy was or was not planned in advance and guided by a documented and monitored treatment plan. While it is likely that long-term opioid therapy frequently evolves through self-selection in the absence of an agreed upon treatment plan, research is needed to determine the extent to which long-term opioid therapy is planned versus unplanned. Since the data presented in this paper were based largely on automated pharmacy data, no information on pain or functional status were available to characterize outcomes.

Several other features of the observed patterns of long-term opioid use merit further research. Patients receiving Defacto Long-term Opioid Therapy most often used combination medications with acetaminophen or aspirin. The extent to which patients using compound medications are also receiving acetaminophen or aspirin from other sources deserves further study to assess potential health risks [22]. Propoxephene was also commonly used in Defacto Long-Term Opioid Therapy despite some evidence that it is no more effective that nonsteroidal anti-inflammatory drugs [23] and that, like other opioid medications, there are health risks when used with alcohol [24]. The relative effectiveness and safety of potent long-acting versus more and less potent short-acting opioids is also an important issue for further research, as the less potent, short-acting opioids were by far the most frequently prescribed in Defacto Long-term Opioid Therapy.

Expert guidelines do not address long-term opioid therapy that occurs via patient self-selection rather than based on a prospective treatment plan agreed upon by patient and

physician with subsequent monitoring of progress [13]. By setting a clear boundary between acute and episodic use on the one hand, and long-term use on the other, it may be possible for physicians and health plans to establish a check point after which a treatment plan for long-term opioid therapy is expected to be documented and monitored. At both health plans, setting a threshold for Defacto Long-term Opioid Therapy at an episode duration of greater than 90 days with at least 10 prescriptions or 120 days supply dispensed would affect a relatively small percentage of all patients prescribed opioid medications, but these episodes would account for the majority of morphine equivalents dispensed on a population basis.

Summary

Episodes of Defacto Long-term Opioid Therapy accounted for a small percentage of the opioid use episodes for non-cancer pain in the study populations, but these episodes accounted for the majority of morphine equivalents dispensed. Defacto Long-term Opioid Therapy was characterized by considerable variability in medications dispensed, dosage levels, and frequency of opioid use. The thresholds for Defacto Long-term Opioid Therapy provide a possible checkpoint at which physicians and health plans could ensure that a documented treatment plan for long-term opioid therapy has been developed and is being monitored by the prescribed physician.

Acknowledgments

This research was supported by NIDA grant R01 DA022557.

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Table 1

CONSORT(CONsortium to Study Opioid Risks and Therapeutics) classification of opioid medications and morphine equivalent conversion factors per milligram of opioid.[1]

Major Group	Type of Opioid	Morphine equivalent conversion factor per mg of opioid
Short-acting Less potent (Schedule III/IV)	Propoxyphene (with or without aspirin/acetaminophen/ibuprofen)	0.23
	Codeine + (acetaminophen, ibuprofen or aspirin)	0.15
	Hydrocodone + (acetaminophen, ibuprofen, or aspirin) Hydrocodone and homatropine	1.0
	Tramadol with or without aspirin	0.10
	Butalbital and codeine (with or without aspirin, ibuprofen, acetaminophen)	0.15
	Dihydrocodeine (with or without aspirin, ibuprofen, acetaminophen)	0.25
	Pentazocine (with or without aspirin, ibuprofen, acetaminophen)	0.37
Short-acting, More Potent (Schedule II)	Morphine sulfate	1.0
	Codeine sulfate	0.15
	Oxycodone (with or without aspirin, acetaminophen, ibuprofen)	1.5
	Hydromorphone	4.0
	Meperidine hydrochloride	0.1
	Fentanyl citrate transmucosal[2]	0.125
	Oxymorphone	3.0
Long-acting (Schedule II)	Morphine sulfate sustained release	1.0
	Fentanyl transdermal[3]	2.4
	Levorphanol tartrate	11.0
	Oxycodone HCL controlled release	1.5
	Methadone	3.0

[1] Opioids delivered by pill, capsule, liquid, transdermal patch, and transmucosal administration were included in CONSORT data. Opioids formulated for administration by injection or suppository were not included.

[2] Transmucosal fentanyl conversion to morphine equivalents assumes 50% bioavailability of transmucosal fentanyl and 100 micrograms transmucosal fentanyl is equivalent to 12.5 to 15 mg of oral morphine.

[3] Transdermal fentanyl conversion to morphine equivalents is based on the assumption that one patch delivers the dispensed micrograms per hour over a 24 hour day and remains in place for 3 days.

Table 2

Percent of opioid episodes by most frequently prescribed opioid during the episode, episodes starting in 1997 through 2005.

	All Episodes		Long-term Episodes	
Type of Opioid Most Frequently Prescribed	**Group Health**	**Kaiser N. Ca.**	**Group Health**	**Kaiser N. Ca.**
Short-acting, Less potent				
Propoxyphene	4.4 %	8.8 %	6.9 %	11.8 %
Codeine + aspirin/acetaminophen	19.5 %	20.3 %	12.7 %	9.2 %
Hydrocodone + aspirin/acetaminophen	49.5 %	68.0 %	42.5 %	67.2 %
Tramadol with or without aspirin	0.6 %	0.5 %	2.7 %	2.2 %
Butalbital and codeine	<0.1%	<0.1 %	0.2 %	0.3 %
Dihydrocodeine	0.0 %	<0.1 %	0.0 %	0.0 %
Pentazocine	<0.1 %	<0.1%	<0.1 %	0.1 %
Any short-acting Schedule III	74.0 %	97.8 %	65.0 %	90.9 %
Short-acting, More potent				
Morphine sulfate	<0.1 %	<0.1%	0.1 %	0.2 %
Codeine sulfate	0.2 %	<0.1%	0.3 %	<0.1 %
Oxycodone	22.9 %	1.5%	21.0 %	2.7 %
Hydromorphone	0.8 %	0.1%	0.8 %	0.3 %
Meperidine hydrochloride	0.7 %	<0.1%	0.5 %	<0.1 %
Fentanyl citrate transmucosal	0.0 %	<0.1%	0.0 %	<0.1 %
Oxymorphone	0.0 %	0.0%	0.0 %	0.0 %
Any short-acting Schedule II	24.5 %	1.7%	22.6 %	3.4 %
Long-acting				
Morphine sulfate sustained release	0.9 %	0.2%	6.8 %	2.2 %
Fentanyl transdermal	0.1 %	0.1%	1.1 %	1.6 %
Levorphanol tartrate	<0.1 %	<0.1%	0.1 %	<0.1 %
Oxycodone HCL controlled release	0.4 %	<0.1%	3.2 %	0.6 %
Methadone	0.1 %	<0.1%	1.3 %	1.3 %
Any long-acting	1.5 %	0.4%	12.4 %	5.7 %
Total number of opioid use episodes	416,094	2,675,704	23,440	125,935

Table 3

Profile of Opioid Use Episodes Among Adults in *1997–2005*

Episode Type	Percent Of Total Episodes	Mean Duration (Days)	Prescribed Daily Dose (mg morphine equivalents)	Average Daily Dose (mg morphine equivalents)	Mean Days Supply	Percent Of Total Days Supply Dispensed Across all Episodes	Percent of Total Morphine Equivalents Dispensed Across All Episodes
Group Health Cooperative (N=416,094 episodes of opioid use)							
Acute (N=334,367)	80.4 %	14 days	32.2 mg	24.3 mg	9.4 days	19.1 %	12.4 %
Episodic (N=58,287)	14.0 %	194 days	30.2 mg	4.4 mg	29.3 days	10.4 %	7.0 %
Long-term – Lower Dose (N=17,216)	4.1 %	824 days	24.4 mg	8.1 mg	341.2 days	35.8 %	17.6 %
Long-term -Higher Dose (N=6,224)	1.5 %	994 days	64.4 mg	57.8 mg	915.4 days	34.7 %	63.0 %
Kaiser Permanente of Northern California (N=2,675,704 episodes of opioid use)							
Acute (N=2,199,894)	82.2 %	12 days	55.3 mg	36.5 mg	7.2 days	18.1 %	16.1 %
Episodic (N=349,875)	13.1 %	197 days	48.8 mg	6.0 mg	27.7 days	11.1 %	10.3 %
Long-term – Lower Dose (N=90,814)	3.4 %	893 days	29.5 mg	8.8 mg	358.9 days	37.4 %	19.3 %
Long-term -Higher dose (N=35,121)	1.3 %	1047 days	72.1 mg	51.0 mg	829.6 days	33.4 %	54.4 %