

# Chronic opioid adherence and health care costs in a managed care population

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## INTRODUCTION

In contrast to acute episodes of pain, chronic pain ceases to serve a protective purpose, is persistent, and disrupts normal living.<sup>1</sup> Opioids are often prescribed for chronic pain management.<sup>2,3</sup> Opioid regimen nonadherence, use of unprescribed controlled drugs, or use of illegal drugs could lead to inadequate pain control, dependence, or overdose, which could affect health care outcomes, including costs. Rates of chronic opioid use and costs generated by patients on chronic regimens are not well-characterized in the published literature.

## OBJECTIVE

This study was initiated in order to inform our knowledge of chronic opioid therapy use among managed care patients in the U.S. We were interested in comparing the total health care costs incurred by patients adherent to chronic opioid therapy with those of patients who were not adherent according to urine monitoring results, and in determining whether nonadherence contributed to health care costs.

## MATERIALS AND METHODS

- Retrospective, managed care claims-based analysis of patients with evidence of long-term prescription opioid use (>120 days supply over 6 months) during the period 01 Jan 2006 through 30 Sept 2007.
  - Included geographically diverse commercial, Medicare Advantage, and Medicaid health plan members.
  - Patients were required to have 18-months of continuous health plan enrollment.
- Patients with chronic opioid use and claims-based evidence of urine drug monitoring services were identified and matched to a database of monitoring test results.
  - Results from the first monitoring test after identification as a chronic opioid-user (index test) were used to determine adherence to the prescribed opioid regimen.
  - A proprietary algorithm was applied to determine whether urine levels of the prescribed opioid or metabolite were in an expected range. Whether the prescribed opioid was absent and whether unprescribed controlled drugs or illegal drugs were present was also determined.
- The 6-month period prior to the index monitoring test was defined as the baseline period.
- Differences in health care costs for the 12-month period following testing were compared using generalized linear modeling.

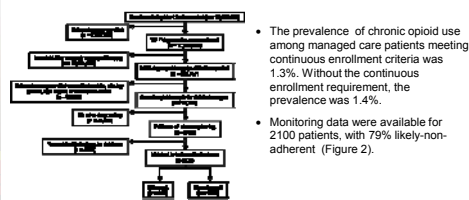


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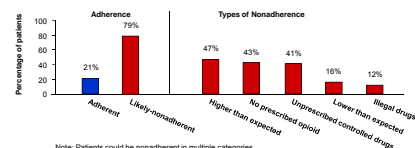
## RESULTS

Figure 1. Identification of chronic opioid users and classification of adherence



- The prevalence of chronic opioid use among managed care patients meeting continuous enrollment criteria was 1.3%. Without the continuous enrollment requirement, the prevalence was 1.4%.
- Monitoring data were available for 2100 patients, with 79% likely-non-adherent (Figure 2).

Figure 2. Distribution of monitoring test results



Note: Patients could be nonadherent in multiple categories.

Table 1. Baseline characteristics of adherent vs likely-nonadherent patients

	Adherent (n = 442)		Likely-nonadherent (n = 1658)		P-value
	n	%	n	%	
Age group					
0-17 years	0	0.0	0	0.0	0.651
18-44 years	174	39.4	685	41.3	
45-64 years	261	59.1	953	57.5	
≥65 years	7	1.6	20	1.2	
Female	254	57.5	981	59.2	0.518
Insurance type					0.044
Commercial	433	98.0	1581	95.4	
Medicare Advantage	5	1.13	51	3.1	
Medicaid	4	0.9	26	1.6	
Region					0.209
Northeast	16	3.6	74	4.5	
Midwest	75	17.0	236	14.2	
South	288	65.2	1148	69.2	
West	63	14.3	201	12.1	
Mental health benefit	423	95.7	1602	96.8	0.354
Mean	SD	Mean	SD		
Charlson-Daquin comorbidity score	0.49	0.92	0.51	1.08	0.816
Unique medications	9.4	5.9	10.0	6.4	<0.001
Total medication dispensings	26.1	16.1	33.7	20.8	<0.001
Opioid dispensings	8.8	5.4	10.4	6.9	<0.001
Days' supply of opioids	171.3	77.6	194.9	89.4	<0.001

## RESULTS (cont.)

### Twelve-month health care utilization and costs

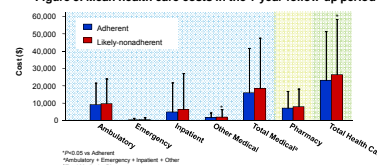
- The number of health care visits was high for chronic opioid users—approximately 33 ambulatory visits per patient in the follow-up period—but no significant differences were observed between the adherent and likely-nonadherent cohorts (Table 2).
- Likely-nonadherent patients spent 35% more days in-hospital than adherent patients (Table 2).

Table 2. Number of health care visits during the 1-year follow-up period

	Adherent			Likely-nonadherent			P-value
	Mean	SD	Median	Mean	SD	Median	
Ambulatory visits	32.3	20.3	26.0	33.3	23.0	28.0	0.417
Emergency visits	1.6	6.2	0.0	1.7	4.0	0.0	0.805
Hospital admissions	0.3	0.9	0.0	0.4	0.9	0.0	0.109
Hospital days	Days/1000 patients			Days/1000 patients			<0.001
	1753			2370			

- As shown in Figure 3, total health care costs were significantly greater for likely-nonadherent patients (\$26,433 vs \$23,160; P = 0.036).

Figure 3. Mean health care costs in the 1-year follow-up period



### Demographic-adjusted multivariate analyses of total follow-up costs

- After adjustment, total 1-year health care costs for nonadherent patients were estimated to be \$26,419, which is 14% greater than the \$23,263 predicted for adherent patients. This difference in costs due to nonadherence was statistically significant (Table 3).

Table 3. Model adjusted for adherence

	Cost Ratio	95% CI	P-value
Adherent	0.891	0.726-1.00	0.048
Age	1.004	1.004-1.01	0.156
Male	0.800	0.732-0.89	<0.001
West region	1.155	0.87-1.54	0.328
Midwest region	0.807	0.61-1.07	0.141
South region	0.839	0.65-1.08	0.179
Mental health benefit	1.138	0.86-1.50	0.366
Medicare	0.691	0.50-0.96	0.025
Medicaid	0.797	0.51-1.25	0.320
Index month by year	1.003	0.99-1.01	0.497

Note: 2100 observations. CI, confidence interval.

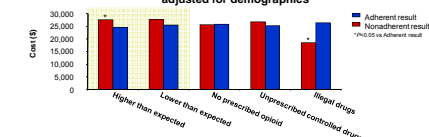
Table 4. Model adjusted for nonadherent test results

	Cost Ratio	95% CI	P-value
Result higher than expected range	1.121	1.05-1.25	0.039
Result lower than expected range	1.090	0.93-1.28	0.263
No prescribed medication	0.962	0.89-1.11	0.888
Unprescribed medication present	1.063	0.96-1.19	0.276
Illegal drug present	0.704	0.59-0.84	<0.001
Age	1.003	1.001-1.01	0.335
Male	0.815	0.732-0.91	<0.001
West region	1.109	0.83-1.47	0.515
Midwest region	0.793	0.60-1.05	0.107
South region	0.821	0.64-1.06	0.129
Mental health benefit	1.119	0.85-1.48	0.433
Medicare	0.716	0.52-0.99	0.044
Medicaid	0.807	0.52-1.28	0.344
Index month by year	1.003	0.99-1.01	0.493

## RESULTS (cont.)

- Patients with higher than expected urine drug levels were predicted to be 12% more expensive than patients whose drug levels were in an expected range (\$27,631 vs. \$24,650) after controlling for types of nonadherence and demographics (Table 4).
- Patients with lower than expected urine drug levels (\$27,752) and those with higher than expected levels (\$27,631) had the highest predicted costs (Figure 4).

Figure 4. Predicted total health care costs for nonadherent test results adjusted for demographics



## DISCUSSION

- The prevalence of chronic opioid use in this U.S. managed care population was approximately 1.3%, which is similar to that presented in previous reports.<sup>4,5</sup>
- Likely-nonadherent patients were predicted to be 14% more expensive than adherent patients, and had significantly more hospital days.
- Patients with urine drug levels outside the expected range had higher costs than adherent patients.
  - Urine drug levels above the expected range could indicate inadequate pain control (additional use of opioid medication) or potential medication abuse. These behaviors could put patients at risk for side effects or overdose, which would further increase their need for supportive care and increase costs.
  - Patients with urine drug levels below the expected range could have higher use of diagnostic services or other treatments.
- Individuals with monitoring results indicating use of illegal drugs appear to have lower health care costs, possibly because they drop out of the health care system or their pain is intractable.
- The adherence definition is limited by possible discrepancies in the information provided to the testing facility regarding the opioid regimen, which would affect the determination of abnormal levels of the prescribed opioid or inappropriate use of other prescription drugs.
- Additional research is needed to determine whether feedback provided by monitoring helps to guide care in practice or directly reduces costs.

## CONCLUSION

Most chronic opioid users receiving urine drug testing are likely to be nonadherent. Our data suggest that opioid prescription nonadherence is associated with elevated health care costs; in particular among patients with medication levels that are higher than expected. Identifying and addressing reasons for nonadherence could improve care and reduce costs generated by patients with chronic pain.

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