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Predictors of Healthcare Effectiveness Data and Information Set (HEDIS) treatment initiation and engagement among patients with opioid use disorder across 7 health systems

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Abstract

Background: The prevalence of opioid use disorder (OUD) has increased rapidly in the United States and improving treatment access is critical. Among patients with OUD, we examined factors associated with the Healthcare Effectiveness Data and Information Set (HEDIS) performance measures of alcohol and other drug (AOD) treatment initiation and engagement.

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Author contributions

C.I.C. conceived of the analysis, collected data, and wrote the manuscript. B.A., G.L., I.A.B., R.C.H., I.V.H., A.L., A.A., and B.J.Y. contributed data and critically revised the manuscript. A.H.K.-S. coordinated data collection across sites, oversaw analysis, and drafted the Methods and Results sections, and C.W. oversaw research conception and design and critically revised the manuscript.

Methods: Electronic health record and claims data between October 1, 2014, and August 15, 2015, from 7 health systems were used to identify patients (n = 11,490) with a new index OUD diagnosis (no AOD diagnosis prior <60 days) based on International Classification of Diseases (ICD)-9 codes. Multivariable generalized linear models with a logit link clustered on health system were used to examine the associations of patient demographic and clinical characteristics, and department of index diagnosis, with HEDIS measures of treatment initiation and engagement.

Results: The prevalence of OUD among all AOD diagnoses varied across health systems, as did rates of AOD initiation (5.7%–21.6%) and engagement (7.6%–24.6%). Those diagnosed in the emergency department (adjusted odds ratio [aOR] = 1.58, 95% confidence interval [CI] = 1.27,1.97) or psychiatry/AOD treatment (aOR = 2.92, 95% CI = 2.47,3.46) were more likely to initiate treatment compared with primary care. Older patients were less likely to initiate (age 50–64 vs. age 18–29: aOR = 0.42, 95% CI = 0.35, 0.51; age 65+ vs. age 18–29: aOR = 0.34, 95% CI = 0.26, 0.43), as were women (aOR = 0.72, 95% CI = 0.62, 0.85). Patients diagnosed in psychiatry/AOD treatment (aOR = 2.67, 95% CI = 1.98, 3.60) compared with primary care were more likely to engage in treatment. Those identified in an inpatient setting (aOR = 0.19, 95% CI = 0.14, 0.27 vs. primary care), those with medical comorbidity (aOR = 0.70, 95% CI = 0.52, 0.95), and older patients (age 50–64 vs. 18–29: aOR = 0.64, 95% CI = 0.46, 0.88; age 65+ vs. 18–29: aOR = 0.36, 95% CI = 0.22, 0.57) were less likely to engage in treatment.

Conclusions: Rates of initiation and engagement for OUD patients vary widely with noticeable room for improvement, particularly in this critical time of the opioid crisis. Targeting patient and system factors may improve health system performance, which is key to improving patient outcomes.

Keywords

Health services research; HEDIS; opioid use disorder; quality indicators; treatment

Introduction

The United States continues to face an opioid crisis. Opioid use disorder (OUD) and adverse events such as opioid-related overdose continue to increase, with approximately 2 million people (> 12 years of age) having an OUD.[1,2] The majority of drug overdoses involve an opioid, with more than 42,000 opioid-related deaths in 2016, 40% of which involved a prescription opioid.[3,4] Although prescription opioid use has leveled off,[4] heroin use has increased and the rate of heroin-related overdose deaths increased more than 5 times.[5,6] Opioid-related death rates exceed those related to other illicit drugs, such as cocaine and amphetamines, and are particularly high in some states.[3]

The increase in OUD is reflected in admissions to substance use treatment nationally, with an increase in the percent of admissions for OUD increasing 58% in 2015 compared with 2005.[7] Even so, access to treatment for OUD remains very limited.[8]

The Healthcare Effectiveness Data and Information Set (HEDIS), developed by the National Committee for Quality Assurance (NCQA), is a widely used set of performance measures across many health conditions that can be used by health systems to improve quality of care.

[9] The HEDIS measure of "Initiation and Engagement of Alcohol and Other Drug Dependence Treatment" reflects access to AOD treatment. Overall, HEDIS initiation and engagement measures have identified low initiation and engagement for populations with AOD disorders.[10–13] However, the widespread concern generated by the opioid crisis may lead to a heightened awareness of the importance of treatment for patients with OUD. The study aim is to examine the HEDIS initiation and engagement measures specifically among patients with OUD from diverse health systems, and to identify which patient characteristics and care settings may be related to initiation and engagement. Identifying patients and settings that are associated with a lower likelihood of initiating and engaging in treatment can inform providers and health systems where to focus efforts to support improving access to care for this high-need population.

Methods

Sample and data source

Patients were drawn from a larger, multisite study examining HEDIS AOD initiation and engagement in treatment[12] among adult patients with AOD diagnoses qualifying for the HEDIS measure denominator between October 1, 2014, and August 15, 2015. Data came from 7 health systems from across the United States that represent diverse geographic, patient demographic, and organizational characteristics. For example, some had integrated AOD treatment services, whereas others did not.[12] All health systems have a common distributed data model, the Virtual Data Warehouse (VDW),[14] that contains the harmonized electronic health record and insurance claims data used in the study and extracted with minimal health system-specific customization.[12]

The current study examined a subsample of patients ≥18 years old with a "new" index OUD diagnosis, between October 1, 2014, and August 15, 2015, using International Classification of Diseases (ICD)-9 diagnostic codes. NCQA Measure Technical Specifications define "new" as a period of at least 60 days prior to the index OUD diagnosis without any AOD disorder diagnosis.[15,16] Continuous membership was required 2 months prior through 44 days post the index identification date.

Measures

Performance measure outcomes—We followed the NCQA Measure Technical Specifications; initiation and engagement rates were calculated for adult patients who had a new index identification episode. Initiation was defined as an AOD treatment visit within 14 days after diagnosis (patients diagnosed in an inpatient setting were considered to have initiated treatment per HEDIS definitions).[15,16] Treatment engagement was defined as at least 2 treatment encounters within 30 days after initiation among those who initiated.[15,16] We used the HEDIS measures that aligned with the study time frame, but note that they did not distinguish medication treatment for OUD from behavioral treatment services.

Demographics and comorbidities—Age, sex, and race/ethnicity were extracted from the VDW. Indictors for AOD-related psychiatric and medical conditions in the year prior to the index OUD diagnosis were also created based on ICD-9 diagnostic codes. These

conditions have been found to be related to AOD use by a panel of experts, and the literature.[17–19] Three psychiatric conditions were examined: (1) depression; (2) anxiety and nervous disorders; and (3) psychoses. Eighteen AOD use-related medical conditions included (1) injury and poisonings; (2) hypertension; (3) asthma; (4) acid-related disorders; (5) ischemic heart disease; (6) pneumonia; (7) chronic obstructive pulmonary disease; (8) liver cirrhosis; (9) hepatitis C; (10) diseases of the pancreas; (11) alcoholic gastritis; (12) toxic effects of alcohol (ethyl and unspecified); (13) alcohol neuropathy; (14) drug neuropathy; (15) alcoholic cardiomyopathy; (16) excess blood alcohol level; (17) poisoning by alcohol; and (18) drug dependence in mother-childbirth.

Analysis

Data from the 7 health systems were pooled, and chi-square and analysis of variance (ANOVA) tests were used to examine differences in the patient characteristics and department where the index diagnosis was made, and each of the performance measures. Multivariable generalized linear models with a logit link clustered on health system were used to evaluate factors associated with initiation and engagement. The HEDIS definition considers inpatient stays (excluding detoxication) as initiation; therefore, analyses examining initiation include only patients with diagnoses made in an outpatient or ED setting. Engagement was estimated among all patients who initiated treatment.

Results

Among patients with an AOD diagnosis, the percentage with an OUD diagnosis ranged from 9% to 16% across the 7 health systems (not shown). Overall, there were 11,490 patients from all systems with an OUD index diagnosis (13.3% of all patients with an AOD diagnosis). Of these patients, 54% were women, 1.6% American Indian/Alaskan Native, 1.8% Asian, 0.4% Native Hawaiian/Pacific Islander, 8.1% black/African American, 14.6% Hispanic, 68.4% white, and 5.2% other/unknown, and the average age was 50.6 years (SD = 17.4) (not shown).

Treatment initiation

Among all patients with an OUD index diagnosis, 2,963 (25.8%) initiated treatment. However, since an OUD index diagnosis made during an inpatient encounter automatically qualified as treatment initiation, we restricted estimates of initiation to patients with an index diagnosis during an outpatient or ED setting only (i.e., inpatient excluded) (n = 9,841; Table 1). Among patients with an OUD index diagnosis made in an outpatient or ED setting, 13.5% (n = 1,331/9,841) initiated treatment. Initiation rates for patients with an OUD ranged from 5.7% to 21.6% across the 7 health systems (not shown). More patients aged 50–64, Hispanics, and whites initiated treatment, whereas fewer patients who were aged 65+, African American, or had comorbid medical conditions initiated treatment. More patients who were identified in psychiatry/AOD treatment initiated, whereas fewer patients who were identified in primary care initiated treatment (Table 1).

In the generalized linear model (Table 2), women (adjusted odds ratio [aOR] = 0.72, 95% confidence interval [CI] = 0.62, 0.85) and older compared with younger patients (aORs

range: 0.34–0.58) had lower odds of treatment initiation. Patients whose OUD was diagnosed in an ED (aOR = 1.58, 95% CI = 1.27, 1.97) or psychiatry/AOD treatment setting (aOR = 2.92, 95% CI = 2.47, 3.46) had higher odds of treatment initiation compared with primary care. Race/ethnicity and prior medical and psychiatric conditions were not significant (Table 2).

Treatment engagement

Engagement was calculated among all patients with an OUD index diagnosis who initiated AOD treatment, including patients with an index inpatient encounter (n = 2,963; Table 3). Of patients who initiated treatment, 18.9% engaged in treatment; rates ranged from 7.6% to 24.6% across health systems (not shown). More men, patients aged 18–29 or 30–49, and Hispanic patients engaged in treatment, whereas fewer patients who were aged 65+, African American, or had comorbid medical conditions engaged in treatment. More patients whose OUD diagnosis was made in psychiatry/AOD treatment or primary care engaged in treatment. Fewer patients identified in an inpatient setting engaged in treatment (Table 3).

In the generalized linear model (Table 4), patients aged 50–64 (aOR = 0.64, 95% CI = 0.46, 0.88) and 65+ (aOR = 0.36, 95% CI = 0.22, 0.57) had lower odds of engagement compared with younger patients aged 18–29. Medical conditions in the year prior to index were associated with lower odds of engagement (aOR = 0.70, 95% CI = 0.52, 0.95). Compared with index encounters made in a primary care setting, patients with inpatient index encounters had lower odds of engagement (aOR = 0.19, 95% CI = 0.14, 0.27) and those in psychiatry/AOD treatment had higher odds (aOR = 2.67, 95% CI = 1.98, 3.60). Race/ethnicity and prior psychiatric conditions were not associated with engagement.

Discussion

In this study of HEDIS initiation and engagement measures among patients with OUD, we found substantial variation in the prevalence of new documented OUD diagnoses across the health systems. This is perhaps not surprising, given the geographic and population diversity of the participating health systems.[12] This variation likely reflects several factors in addition to true prevalence, such as patient characteristics and differences in practices used to identify OUD. The participating health systems' rates of AOD initiation and engagement varied as well, although all rates were low, indicating that even in health systems where patients are largely insured and treatment is available, uptake is low. This is particularly concerning in light of the urgency to address the opioid crisis. These rates leave considerable room for improvement and emphasize the need to develop policies and interventions to improve referrals to treatment and make treatment more attractive and accessible to patients.

We note that during this study period, the HEDIS measures definitions did not specifically include medication treatment for OUD; thus, patients treated with buprenorphine and naltrexone would only be included in these analyses if they also used other treatment services. It is likely that rates would be somewhat higher if the measures specifically included medication for OUD. However, although rates would likely improve, given the challenges associated with increasing buprenorphine prescribing in general, many patients would likely still not be getting needed services. In 2018, the HEDIS measures will include

use of buprenorphine and methadone in the specifications, and future research should examine these revised measures.

Initial OUD diagnoses were most frequently made in a psychiatry/AOD treatment setting, which is not surprising because many patients are likely to be assigned a diagnosis when entering specialty care. However, a considerable portion was also identified in the primary care setting, which is where most opioids are prescribed.[20] This emphasizes that primary care providers are recognizing and noting that patients have an OUD and reinforces the importance of primary care as a point for possible intervention. Identification in the ED varied widely but was generally modest, which is not unexpected given that ED use is a relative rare. However, the ED presents a unique opportunity to intervene with patients. In particular, patients using heroin may be more likely to present to the ED than primary care.

There were similarities and differences among factors associated with initiation and engagement. Younger patients and men were more likely to initiate treatment, which may be due to younger patients having fewer logistical barriers to seeking care (e.g., family obligations), and more women may have childcare considerations. Patients identified in psychiatry or AOD treatment were more likely to initiate treatment, which may reflect a connection they established with clinic providers at the index visit, influencing a return to treatment. Higher initiation may also indicate that some patients obtain, or plan to obtain, buprenorphine in AOD treatment and thus are motivated to return for detox or continued medication. Finally, although we cannot tell from these data, higher initiation in psychiatry/AOD treatment could reflect greater severity among these patients, who have more problems that motivate them to initiate treatment. Similarly, identification in the ED may suggest that patients have had a precipitating event (e.g., injury or accident) that prompted them to initiate treatment. The ED has been shown to be an important setting to engage patients with OUD in medication treatment for OUD,[21] and how to do this in different health systems is important to study. That primary care was a less likely setting for initiating treatment is not surprising, given that office-based buprenorphine treatment has had limited implementation. However, implementation is increasing and has been shown to be successful with a nurse care manager model in an urban academic medical center.[22] Studying how to improve initiation in primary care in these types of health systems is important.

Younger age was also related to higher engagement, which was somewhat unexpected. Often, older patients are perceived as more motivated, since they may have had problems for a longer time, encountered more challenges with work and family, and experienced more medical problems than younger patients. However, younger patients may have fewer responsibilities and logistical challenges to hamper their engagement. Also, they may be recognized as having problems by organizations and employers more often. Strategies to engage older patients are important and need further study. Patients who engaged in treatment were also less likely to have co-occurring medical conditions, as would be expected with younger age, which may reflect that they are more physically able to attend treatment. For example, patients with an OUD often have chronic pain, which can limit their ability to attend treatment programs or continue treatment for a prolonged period of time. The traditional AOD treatment program may lack the structure or flexibility to address the

needs of these patients. Patients identified in inpatient index encounters also had lower odds of engagement, suggesting that patients with a recent inpatient procedure (e.g., surgery) or serious illness may not be physically or psychologically ready to engage in treatment. Pain related to their condition may complicate motivation for treatment. Alternative treatment modalities, or programs that can use health information technology options, may be useful at least to initially engage patients. Hospitalizations related to OUD and associated infections have been increasing,[23] suggesting increased need for treatment, and a small study of buprenorphine initiation in an inpatient setting was promising. Collaborative care models in inpatient settings for patients with substance use disorders have shown improved outcomes and deserve further study in patients with OUD as an opportunity to intervene.[24,25]

Limitations

This study has limitations. HEDIS initiation and engagement measures rely on clinical diagnostic codes that are assigned during health system encounters and may underestimate the prevalence of disorders. The quality and specificity of AOD treatment in this study are not known and may vary by health system. The study settings were large health systems and generalizability to other systems, such as federally qualified health centers, may be limited. Patients may be seeking treatment outside of the health systems (e.g., methadone) and this treatment would not be reflected in these measures, as most health systems did not have claims data for methadone treatment. Medication treatment for OUD such a buprenorphine or naltrexone was not identified separately, per HEDIS measurement specifications, during this time period. This likely underestimated the rates of treatment observed. Medical conditions more likely to be reflected in OUD-related hospitalizations (e.g., endocarditis, sepsis, osteomyelitis) were not included in the main data set, and this may affect the lack of association with treatment initiation.

Conclusion

The rates of AOD initiation and engagement for OUD patients vary widely and leave considerable room for improvement, particularly for patients identified in primary care. Health systems appear to have more success at engaging younger patients in treatment, which may have positive implications for these patients long term if they can stay engaged. Future research should examine specific barriers (e.g., financial, geographic) to develop specific strategies and/or alternative models of care (e.g., e-health) to address access for older patients and those with more medical problems. The transition from primary care and inpatient settings to treatment is also an important area of focus. At a time where the opioid crisis shows no sign of abating, particularly for heroin and synthetic opioids, it is even more critical to improve access to treatment for patients with OUD and to identify factors that can help engage them in treatment.

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Table 1.

Characteristics of patients with opioid use disorder by treatment initiation*.

Characteristic	Initiated treatment (*n* = 1,331) *n*	%	Did not initiate treatment (*n* = 8,510) *n*	%	*P* value
Sex					<.001
Female	562	42.2	4,662	54.8	
Male	769	57.8	3,848	45.2	
Age					<.001
18–29	438	33.3	2,527	29.7	
30–49	443	23.7	2,930	34.4	
50–64	316	32.9	1,189	14.0	
65+	134	10.1	1,864	21.9	
Race/ethnicity					0.031
American Indian/Alaska Native	14	1.1	136	1.6	
Asian	35	2.6	142	1.7	
Native Hawaiian/other Pacific Islander	6	0.5	33	0.4	
Black/African American	81	6.1	678	8.0	
Hispanic	202	15.2	1,257	14.8	
White	919	69.1	5,809	68.3	
Other/unknown	74	5.6	455	5.4	
Psychiatric conditions in prior year	706	56.0	4,797	56.4	.023
Medical conditions in prior year	769	57.8	5,883	69.1	<.001
Index encounter type, %					<.001
Inpatient	n/a	n/a	n/a	n/a	
Emergency department	206	15.5	1,102	13.0	
Primary care	438	32.9	4,716	55.4	
Psychiatry/AOD treatment	556	41.8	1,499	17.6	
Other outpatient	131	9.8	1,193	14.0	

*Initiation was estimated among patients with an OUD index diagnosis during an encounter in an outpatient or ED setting (i.e., not inpatient) (*n* = 9,841).

Table 2.

Adjusted odds of treatment initiation among patients with an index OUD diagnosis.

Characteristic	OR	95% CI
Sex		
Female	0.72	0.62, 0.85
Male (ref)	—	—
Age		
18–29 (ref)	—	—
30–49	0.58	0.49, 0.68
50–64	0.42	0.35, 0.51
65+	0.34	0.26, 0.43
Race/ethnicity		
American Indian/Alaska Native	0.69	0.38, 1.26
Asian	1.31	0.87, 1.98
Native Hawaiian/other Pacific Islander	0.87	0.34, 2.21
Black/African American	0.92	0.71, 1.20
Hispanic	0.96	0.80, 1.16
White (ref)	—	—
Other/unknown	0.77	0.57, 1.04
Psychiatric conditions in prior year	1.07	0.91, 1.26
Medical conditions in prior year	0.97	0.82, 1.14
Index encounter type, %		
Inpatient	n/a	n/a
Emergency department	1.58	1.27, 1.97
Psychiatry/AOD treatment	2.92	2.47, 3.46
Other outpatient	1.14	0.91, 1.43
Primary care (ref)	—	—

Table 3.

Patient characteristics by treatment engagement among patients with an opioid use disorder who initiated *.

	Engaged in treatment (*n* = 561)		Did not engage in treatment (*n* = 2,402)		
Characteristic	***n***	**%**	***n***	**%**	***P* value**
Sex					<.001
Female	230	41.0	1,317	54.8	
Male	331	59.0	1,085	45.2	
Age					<.001
18–29	202	36.0	373	15.5	
30–49	211	37.6	543	22.6	
50–64	114	20.3	811	33.8	
65+	34	6.1	675	28.1	
Race/ethnicity					<.001
American Indian/Alaska Native	7	1.3	34	1.4	
Asian	15	2.7	49	2.0	
Native Hawaiian/other Pacific Islander	3	0.5	5	0.2	
Black/African American	24	4.3	231	9.6	
Hispanic	100	17.8	315	13.1	
White	378	67.4	1,666	69.4	
Other/unknown	34	6.1	102	4.3	
Psychiatric conditions in prior year	291	51.9	1,600	66.6	.123
Medical conditions in prior year	295	52.6	1,990	82.9	<.001
Index encounter type, %					<.001
Inpatient	74	13.2	1,558	64.9	
Emergency department	55	9.8	151	6.3	
Primary care	111	19.8	327	13.6	
Psychiatry/AOD treatment	289	51.5	267	11.1	
Other outpatient	32	5.7	99	4.1	

* Engagement was estimated among all patients with an OUD index diagnosis who initiated AOD treatment, including patients with an index inpatient encounter (*n* = 2,963).

Table 4.

Adjusted odds of treatment engagement among patients who initiated treatment*.

Characteristic	OR	95% CI
Sex		
Female	0.95	0.72, 1.26
Male (ref)	—	—
Age		
18–29 (ref)	—	—
30–49	1.02	0.77, 1.35
50–64	0.64	0.46, 0.88
65+	0.36	0.22, 0.57
Race/ethnicity		
American Indian/Alaska Native	1.30	0.50, 3.37
Asian	0.87	0.43, 1.77
Native Hawaiian/other Pacific Islander	1.45	0.27, 7.83
Black/African American	0.61	0.37, 1.01
Hispanic	1.17	0.86, 1.58
White (ref)	—	—
Other/unknown	1.20	0.74, 1.95
Psychiatric conditions in prior year	1.03	0.77, 1.38
Medical conditions in prior year	0.70	0.52, 0.95
Index encounter type, %		
Inpatient	0.19	0.14, 0.27
Emergency department	0.99	0.66, 1.50
Psychiatry/AOD treatment	2.67	1.98, 3.60
Other outpatient	0.93	0.57, 1.52
Primary care (ref)	—	—

* Engagement was estimated among all patients with an OUD index diagnosis who initiated AOD treatment, including patients with an index inpatient encounter (n = 2,963).