



Predictors of 30-Day Hospital Readmission Among Patients with Opioid Use Disorder

Khashayar Eshtiaghi, MBA, Poonam Bhatjire, MS, Marc Fleming, MPH, PhD

Department of Pharmaceutical Economics and Policy, Chapman University School of Pharmacy, Irvine, CA

Background

Opioid use disorder (OUD) impacts approximately 2.1 million people in the United States and was linked to nearly 80,000 deaths in 2023. Opioid-related hospitalizations have risen by over 70%, with inpatient rates increasing from 136.8 per 100,000 individuals in 2005 to 232.6 per 100,000 in 2024. Patients with OUD experience higher 30-day hospital readmission rates, an important performance metric for both healthcare systems and payers.

Objectives

To determine the key predictors of the 30-day hospital readmission rates among OUD patients using electronic health record data.

Methods

A retrospective cohort study was conducted among adult patients hospitalized with OUD using the Medical Information Mart for Intensive Care (MIMIC)-IV database (N = 10,113). Patients with OUD were identified using International Classification of Diseases (ICD-9-CM and ICD-10-CM) diagnosis codes. The primary outcome was all-cause 30-day hospital readmission. Multivariable logistic regression was used to estimate adjusted odds ratios (AORs) with 95% confidence intervals (CIs).

Predictor variables were selected based on the literature and included demographics, prior hospitalization characteristics (e.g., length of stay), psychiatric and substance use factors, and clinical comorbidities. Model discrimination was assessed using receiver operating characteristic (ROC) analysis based on predicted probabilities. All analyses were conducted using R (version 4.5.2).

Results

Table 1. Sample Demographics (N = 10,113)

Variable	Mean (SD); n (%)
Age at Discharge	50 (17)
Gender	
Male	5,606 (55%)
Female	4,507 (45%)
Race	
White	7,148 (71%)
Asian	141 (1.4%)
African American	1,161 (11%)
Hispanic or Latino	566 (5.6%)
Other / Unknown	1,097 (11%)
Marital Status	
Married	2,621 (26%)
Single	5,459 (54%)
Divorced	850 (8.4%)
Other	1,183 (11.6%)
Insurance	
Private	2,076 (21%)
Medicaid	4,169 (41%)
Medicare	3,325 (33%)
Other	543 (5%)

Patients had an average length of stay of 7 days (SD = 10) in their prior hospitalizations, and a mean prior admission count of 1.9 (SD = 4.7). Depression was present in 33% of patients (n = 3,323), anxiety in 25% (n = 2,496), and chronic pain in 23% (n = 2,358). Homelessness was identified in 8.4% (n = 845), and hepatitis C infection in 13% (n = 1,308). Medications for opioid use disorder (MOUD) were received by 23% of patients (n = 2,282).

The multivariable logistic regression model shows that greater prior hospital utilization and longer length of stay were associated with higher odds of readmission. Among clinical and behavioral factors, depression, chronic pain, and hepatitis C infection were also significant predictors.

Results

Compared with White patients, African American patients had higher odds of readmission. In contrast, receipt of MOUD was associated with reduced odds of 30-day readmission.

Table 2. Multivariable Logistic Regression Analysis of 30-Day Readmission Rates Among Patients with OUD

Patient/Hospital Characteristic	AOR (95% CI)	P-value
(Intercept)	0.44 (0.18, 1.02)	0.059
Age at Discharge	0.99 (0.99, 1.00)	0.709
Female (vs Male)	0.92 (0.84, 1.01)	0.082
Race (reference: White)		
Asian	0.99 (0.69, 1.42)	0.986
African American	1.33 (1.16, 1.52)	< 0.001*
Hispanic or Latino	0.99 (0.82, 1.20)	0.972
Marital Status (reference: Married)		
Divorced	0.93 (0.78, 1.10)	0.393
Single	0.95 (0.85, 1.07)	0.414
Insurance (reference: Private)		
Medicaid	0.91 (0.80, 1.04)	0.155
Medicare	1.09 (0.95, 1.24)	0.225
Admission Characteristics		
Length of Stay (days)	1.01 (1.00, 1.01)	< 0.001*
Prior Admission Count	1.10 (1.09, 1.19)	< 0.001*
Discharge Against Medical Advice (Yes vs No)	1.13 (0.87, 1.44)	0.356
Homelessness (Yes vs No)	1.08 (0.92, 1.28)	0.335
Depression (Yes vs No)	1.30 (1.18, 1.43)	< 0.001*
Anxiety (Yes vs No)	0.96 (0.87, 1.07)	0.513
Alcohol Abuse (Yes vs No)	1.11 (0.98, 1.25)	0.109
Benzo Abuse (Yes vs No)	0.89 (0.71, 1.12)	0.335
Cocaine Abuse (Yes vs No)	0.95 (0.83, 1.08)	0.429
Chronic Pain (Yes vs No)	1.25 (1.12, 1.38)	< 0.001*
Hepatitis C (Yes vs No)	1.48 (1.29, 1.68)	< 0.001*
Received MOUD (Yes vs No)	0.86 (0.77, 0.97)	0.011*

OUD, opioid use disorder; AOR, adjusted odds ratios; MOUD, medications for opioid use disorder. *Significant at 0.05 level.

Results

Figure 1. Forest Plot of Key Predictors of 30-Day Hospital Readmission Rates

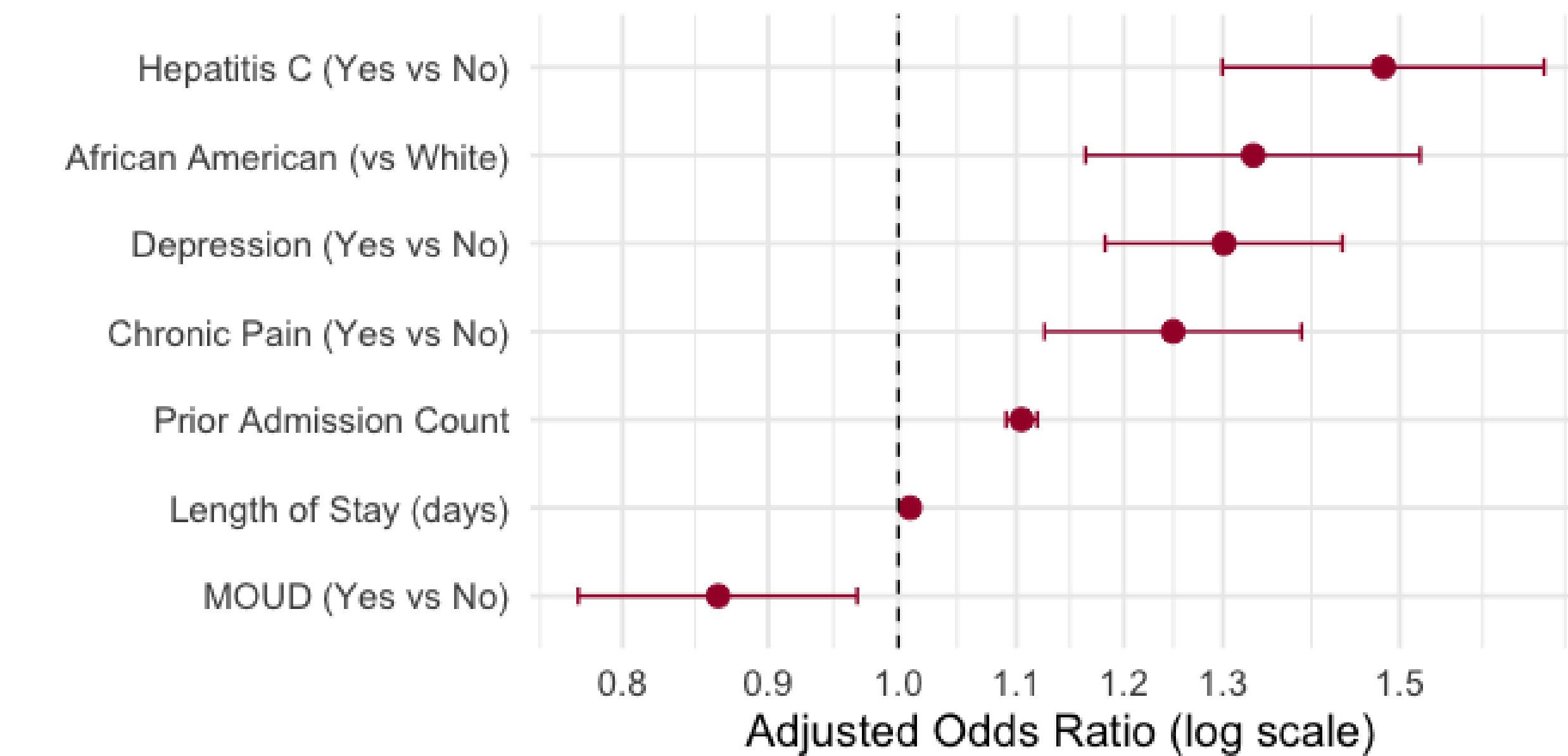
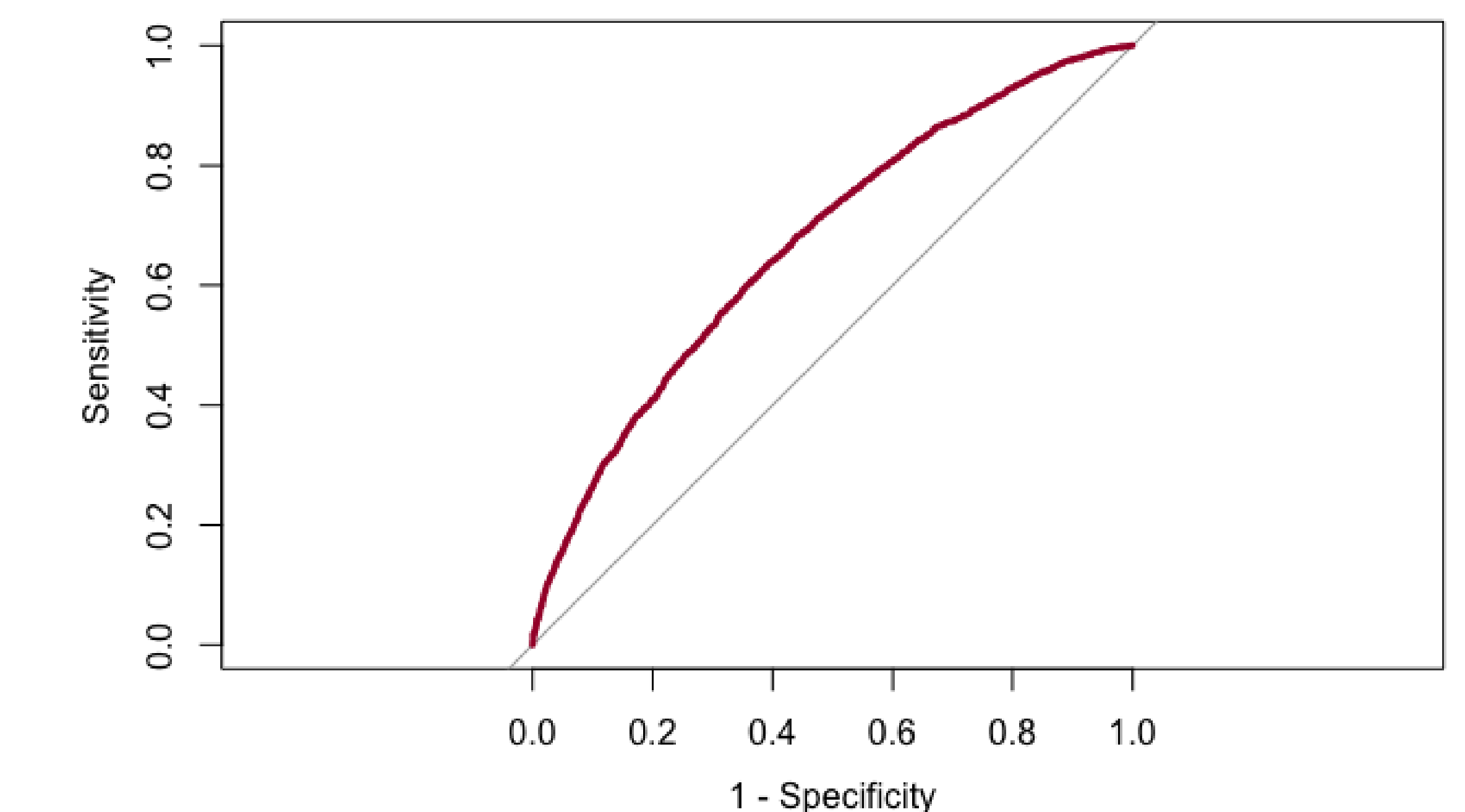


Figure 2. Receiver Operating Characteristic (ROC) Curve (AUC = 0.671)



Conclusions

Among hospitalized patients with OUD, 30-day readmission rates were primarily associated with prior hospital admission, mental and physical health conditions, highlighting the importance of early risk identification. African American patients also had higher odds of readmission compared with White patients, suggesting a need for more focused interventions and equitable care strategies. Receipt of MOUD during hospitalization was associated with lower odds of readmission, supporting the value of evidence-based OUD treatment.