

The Association Between Credit Risk Score and Major Depressive Disorder Burden Using Observed and Estimated PHQ-9 in a Real-World Cohort



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Disclosures

This study was initiated and internally funded by OM1, Inc. Dr. Paulus, Dr. Severtson, Mr. Nelson, Ms. Hoffman, and Dr. Marci are/were employees of OM1, Inc. Dr. Marci is also affiliated with Massachusetts General Hospital and Harvard Medical School.

Background

- Depression is a common mental health condition that may lead to reduced quality of life and poor health outcomes. Validated measures, such as the Patient Health Questionnaire-9 (PHQ-9),¹ are used to measure symptom severity over time.
- The relationships among social determinants of health and mental health outcomes are complex.
- We sought to describe the connection between financial risk factors, mental healthcare utilization, and severity of major depressive disorder (MDD).

Objective

To compare the associations between credit risk score and measures of MDD burden using both observed and estimated measures of PHQ-9 (PHQ-9/ePHQ-9) in a US real-world cohort.

Methods

Study Design

- Retrospective observational cohort study conducted in the PremiOM™ MDD Dataset (OM1, Inc., Boston, MA), a multi-source real-world data network with linked health care claims, social determinants of health, and electronic medical records data on US patients with MDD from all 50 states.

Eligibility Criteria

- Adult patients with MDD, regardless of PHQ-9/ePHQ-9 measure availability, identified during the study period (March 2015 through February 2021) in the PremiOM™ MDD Dataset.

Analysis

- Patient age, race, sex, estimated household income, insurance type, and PHQ-9/ePHQ-9 scores, where available, were assessed at initial diagnosis (index date).
- ePHQ-9 scores estimated using a machine learning model, and PHQ-9 scores (observed or estimated) were used to define MDD severity, where moderately severe to severe MDD defined as PHQ-9/ePHQ-9 ≥ 15 .
- Tertiles of credit score used to categorize patients into low, moderate, and high credit risk subgroups.
- Mean PHQ-9/ePHQ-9 scores, number and percent of patients with mental health-related healthcare visits, and number of antidepressant prescriptions were evaluated during 12-month post-index period.
- Proportion of patients with moderately severe to severe MDD, based on PHQ-9/ePHQ-9 scores, were compared between the lowest and highest credit risk groups at 18 months post-index.

Results

- Univariate regression models compared demographic characteristics and utilization of mental healthcare services between highest and lowest credit risk score groups.

Cohort Demographics (Table 1)

- The study included 3,469,613 patients [68% female, mean age 54 years (SD=18), 89% White] with MDD.
- Median estimated household income for 1,167,117 patients with high credit risk scores was \$47K (Q1, Q3: \$31K, \$66K).
- Median estimated household income for 1,156,793 patients with low credit risk scores was \$80K (Q1, Q3: \$50K, \$130K).
- 15% of high credit risk and 3% of low credit risk had household incomes $< \$25K$, respectively.
- Over 60% of low credit risk patients had at least a college education, compared to 32% of the high credit risk group.
- The proportion of Black patients was 16% and 5% in the high and low credit risk groups, respectively.

Severity of MDD (Table 2)

- For patients with available PHQ-9/ePHQ-9 scores at the index date (N=44,375):
 - Mean PHQ-9/ePHQ-9 was significantly higher among high credit risk patients than among low credit risk patients (13.3 vs. 12.4, $p < .001$).
 - 45% of high credit risk patients had a PHQ-9 ≥ 15 (moderately severe to severe MDD) versus only 40% of low credit risk patients.
 - In the 18 months after the index date, the proportion of patients with moderately severe to severe MDD, based on PHQ-9/ePHQ-9 scores, remained higher among high-risk credit patients as compared to low credit risk patients (25% vs 20%; $p < 0.001$).

Healthcare utilization (Figure 1)

- The receipt of emergency care (3.3% vs 1.9%; $p < .001$) and inpatient mental healthcare services (9.7% vs 6.8%; $p < .001$) were more likely in high credit risk patients versus low credit risk patients
- The receipt of outpatient mental healthcare was less likely in high credit risk patients (30.2% vs. 31.2%; $p < .001$).
- The mean number of prescription fills for antidepressant medications in the 12 months post-index was significantly lower for low credit risk versus high credit risk patients (1.9 vs 2.2; $p < .001$) (not reported).

Conclusions

- In a real-world cohort of MDD patients, higher credit risk scores were associated with increased disease burden as measured by observed and estimated PHQ-9 scores.
- Improving access to outpatient mental healthcare may increase opportunities for more effective treatment of MDD.

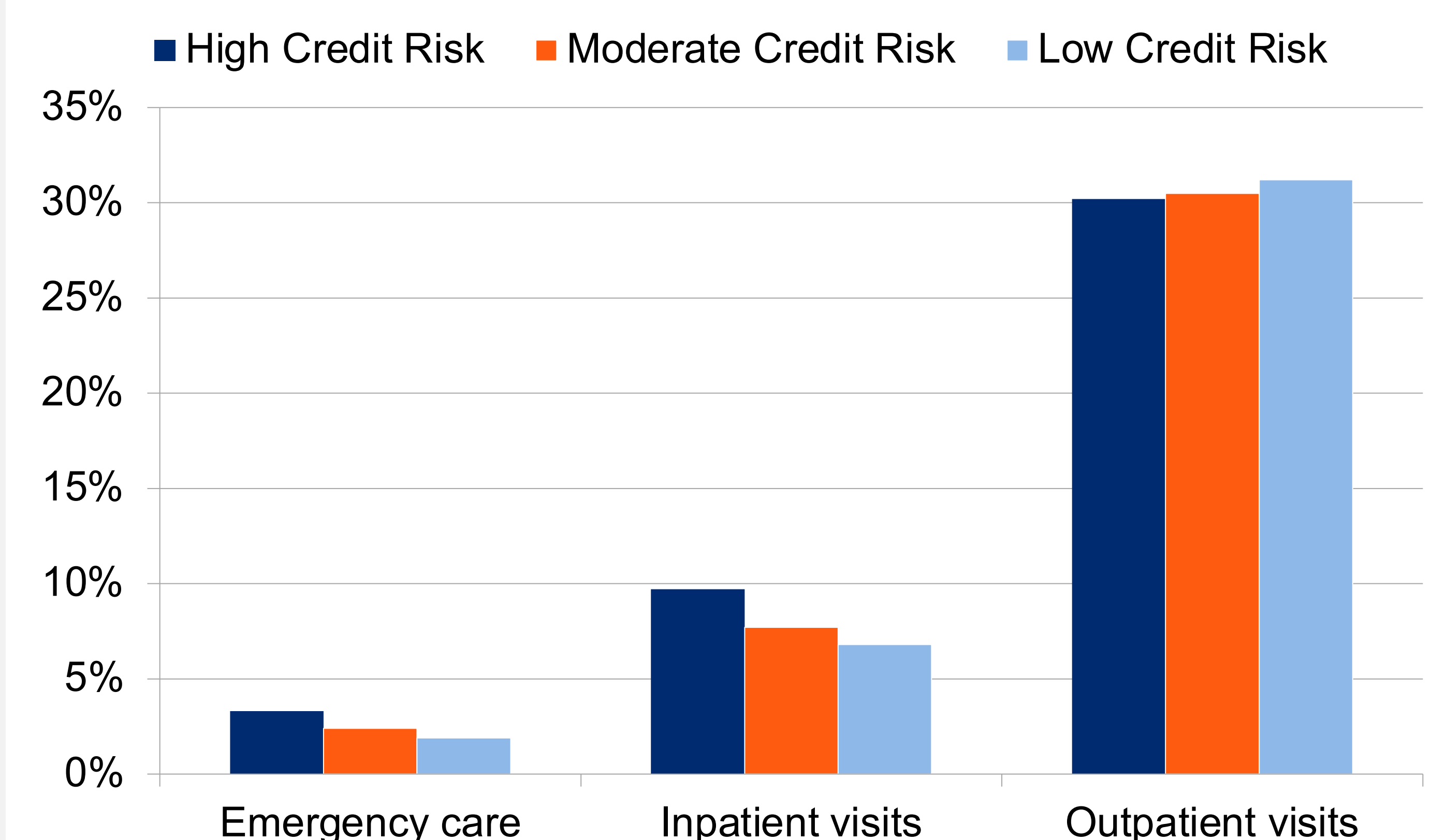
Table 1. Demographic characteristics of patients with MDD, by credit risk score category

	High Credit Risk (N=1,167,117)	Moderate Credit Risk (N=1,145,703)	Low Credit Risk (N=1,156,793)
Mean Age (SD)	51.2 (17.6)	53.9 (18.0)	55.9 (18.3)
Female	826,150 (70.8%)	778,969 (68.0%)	770,838 (66.6%)
Race			
Black	69,376 (16.3%)	34,608 (7.6%)	22,314 (4.7%)
White	348,600 (82.1%)	410,879 (90.8%)	444,824 (93.8%)
Other	6,651 (1.6%)	7,041 (1.6%)	7,063 (1.5%)
Unknown	742,490	693,175	682,592
Mean Credit Score (SD)	28.2 (13.1)	60.1 (6.9)	83.4 (7.5)
Median Household Income (Q1, Q3)	\$47K (\$31K, \$66K)	\$60K (\$39K, \$92K)	\$80K (\$50K, \$130K)
Insurance			
Commercial	592,188 (50.7%)	568,002 (49.6%)	561,088 (48.5%)
Medicaid	149,324 (12.8%)	87,038 (7.6%)	55,850 (4.8%)
Medicare	260,629 (22.3%)	279,110 (24.4%)	314,282 (27.2%)
Education			
Less Than HS	49,504 (4.3%)	19,111 (1.7%)	6,662 (0.6%)
HS Degree	659,698 (57.5%)	497,748 (44.2%)	370,681 (32.4%)
Some College	59,197 (5.2%)	51,903 (4.6%)	42,675 (3.7%)
Vocational/Tech	11,622 (1.0%)	12,256 (1.1%)	11,086 (1.0%)
Bachelor Degree	311,710 (27.1%)	449,824 (40.0%)	557,185 (48.7%)
Graduate Degree	56,407 (4.9%)	94,903 (8.4%)	156,493 (13.7%)
Unknown	18,979	19,958	12,011

Table 2. Baseline PHQ-9 of patients with MDD, by credit risk score category

	High Credit Risk (N=11,947)	Moderate Credit Risk (N=14,835)	Low Credit Risk (N=17,593)
Mean PHQ-9 / ePHQ-9 scores (SD)	13.3 (6.8)	12.8 (6.8)	12.4 (6.7)
% Moderately Severe or Severe MDD (PHQ-9 / ePHQ-9 ≥ 15)	44.7%	42.4%	39.7%

Figure 1. Percentage of patients with mental health-related healthcare visits in the year following diagnosis of MDD



Conference

Presented at the International Conference on Pharmacoepidemiology & Therapeutic Risk Management, August 23-27, 2023. Halifax, Nova Scotia, Canada.

Reference

¹ Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001;16(9):606-613.