

Evaluation of Outpatient Pharmacogenomic Medication Prescribing Patterns in Relation to Community-Level Social Determinants of Health

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BACKGROUND

- Pharmacogenomics (PGx) is increasingly being integrated into clinical practice across the United States.¹
- However, integration of PGx has been limited to large academic medical centers and resource-intensive environments.^{2,3}
- PGx implementation lags in resource-limited settings which can potentially exacerbate health disparities among underserved communities such as those with lower socioeconomic status.^{2,3}
- Understanding the relationship between social determinants of health (SODH) and PGx medication prescribing patterns may help facilitate equitable PGx implementation.

OBJECTIVE

- Compare the prescribing frequencies of PGx medications among those experiencing different levels of social vulnerability and social deprivation in Colorado (CO).

METHODS

- Retrospective analysis of adult patients prescribed at least one PGx medication in an outpatient setting at UHealth in 2018.
- We obtained clinical and SODH data from the electronic health record (EHR) at UHealth via Health Data Compass, an enterprise data warehouse.
- We evaluated 105 CPIC level A, A/B, and B medications.
- For each patient, a medication is counted once regardless of the number of prescriptions.
- Social vulnerability was determined using the CDC's social vulnerability index (SVI).
- Social deprivation was determined using the Robert Graham Center's social deprivation index (SDI).
- SVI and SDI scores are percentile ranks indicating the extent of disadvantage in a community, with higher scores indicating higher disadvantage.
- Both SVI and SDI are composite measures that are derived from demographic characteristics collected in the American Community Survey (ACS).
- Logistic regression was used to assess the relationship between SVI and SDI scores and the likelihood of being prescribed three or more PGx medications in an outpatient setting, while adjusting for demographics, geographic factors (rural vs urban), and comorbidities using the Charlson Comorbidity Index (CCI).

RESULTS

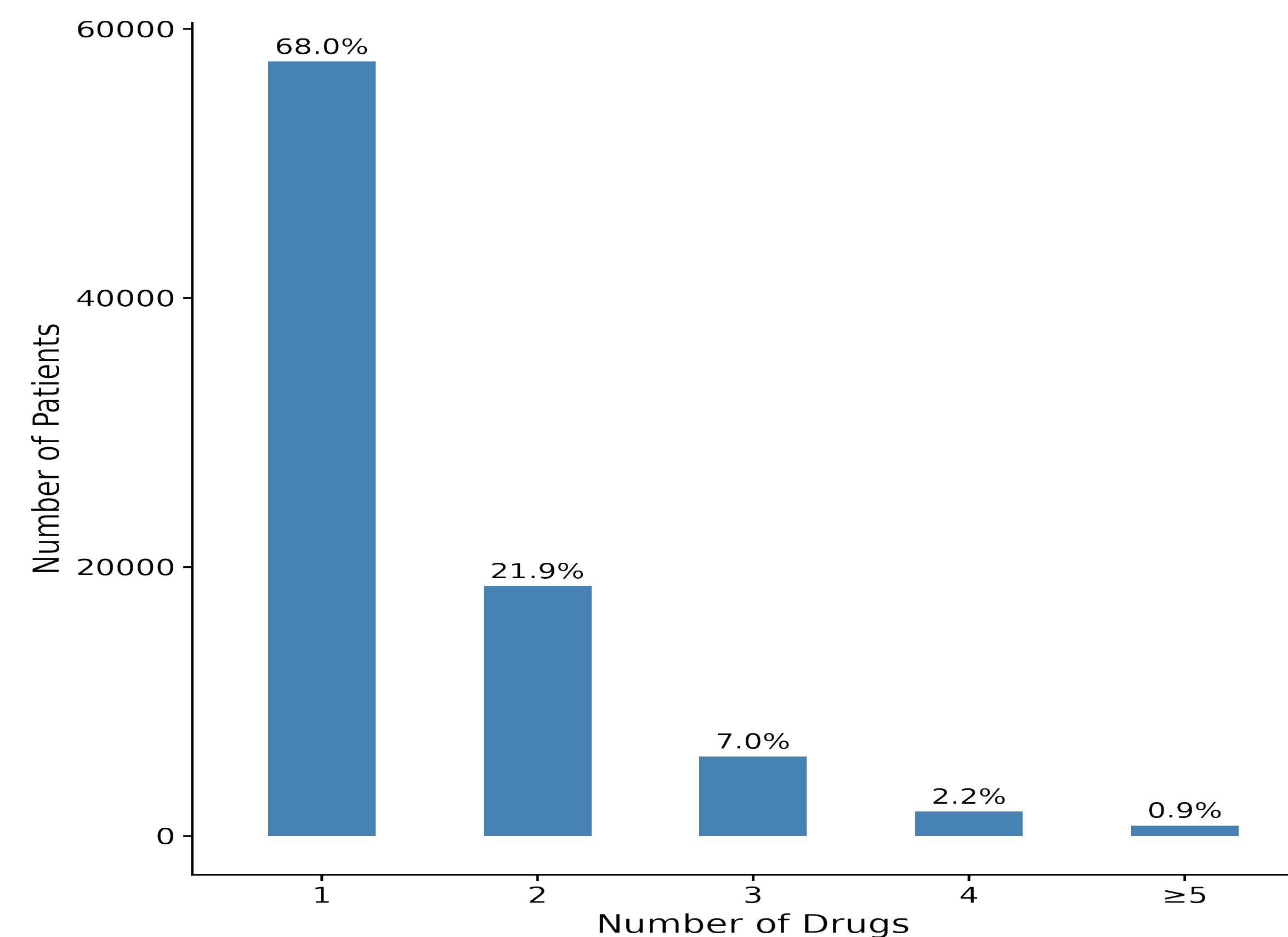
Table 1: Patient Characteristics

Characteristic	N=84,721
Age	55.0 ± 17.3
Sex: Male	34,790 (41.1%)
Race: White	71,408 (84.3%)
Ethnicity: Hispanic	8021 (9.5%)
Geographical setting: Rural	5433 (6.4%)
CCI	
• 0	48,226 (56.9%)
• 1-2	24,231 (28.6%)
• 3-4	6,238 (7.4%)
• ≥ 5	6,026 (7.1%)

Data are presented as mean ± SD or n (%).

- SVI is derived from 15 ACS demographic characteristics that are broadly classified into 4 themes: socioeconomic status, household composition and disability, minority status and language, and housing status and transportation.
- SDI is calculated using 7 ACS demographic characteristics that can be categorized into 3 main themes: socioeconomic status, household composition, and housing status and transportation.

Figure 1: Prevalence of Outpatient PGx Medication Prescribing among UHealth Patients Residing in CO in 2018 (N=84,721)



- The mean number of PGx medications prescribed in an outpatient setting was 1.47 ± 0.81, median 1 (range 1-9).
- 10.1% of patients were prescribed three or more PGx medications.
- The median SVI and SDI scores were 24 (0.01-99.7) and 30 (range 1-100), respectively, which are lower than the national median of 50.

Table 2: Logistic Regression including SVI (N=84,720)

Dependent variable=prescription of ≥ 3 PGx medications in outpatient setting

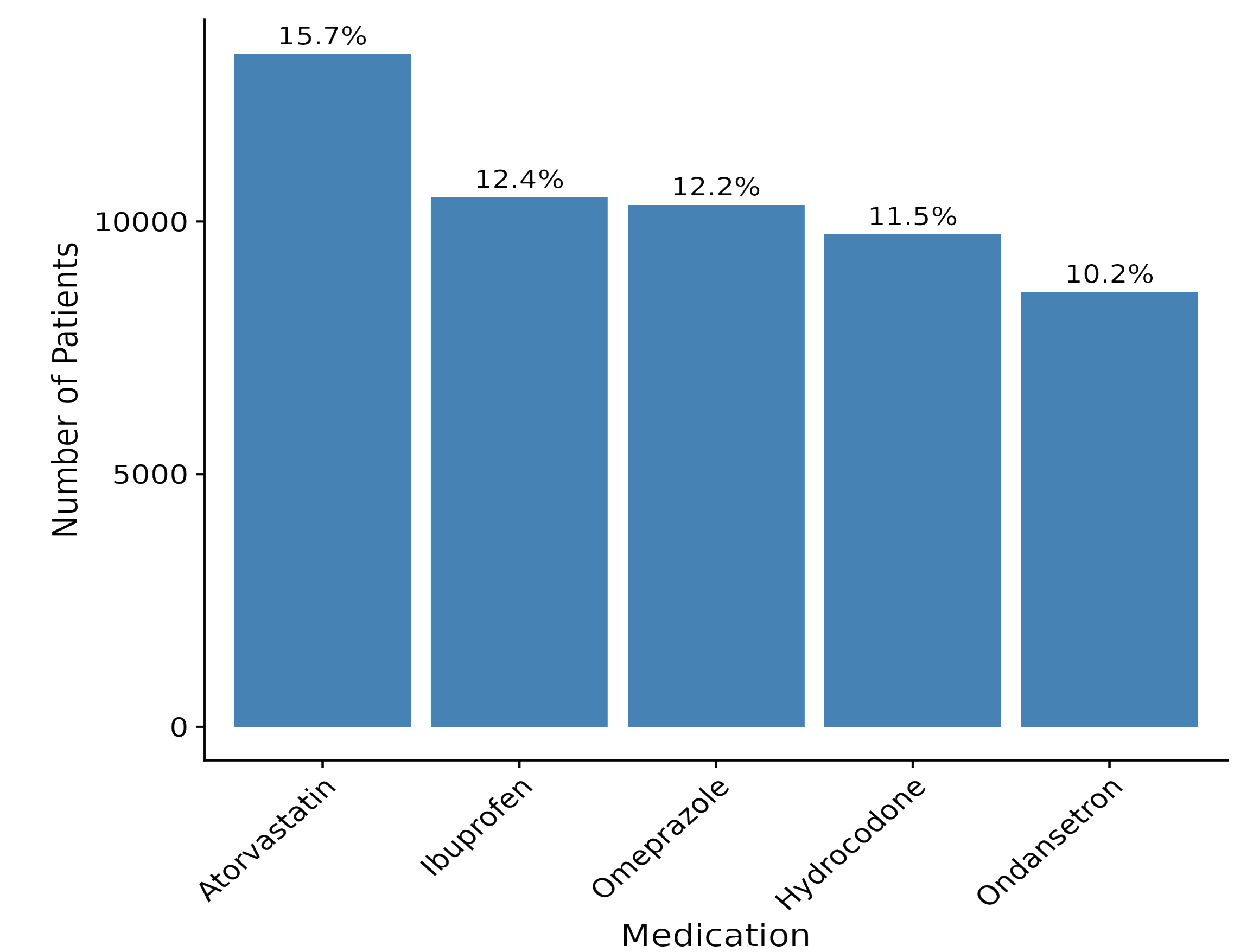
Predictor	Odds Ratio (95% CI)	P-value
SVI percentile	1.10 (1.002-1.20)	0.04
CCI:		
• 1-2	1.70 (1.61-1.79)	<0.001
• 3-4	2.45 (2.26-2.65)	
• ≥5	3.40 (3.15-3.66)	
Sex: Male	0.76 (0.72-0.79)	<0.001
Age by decade	1.06 (1.05-1.08)	<0.001
Race: non-White	0.94 (0.88-1.0)	0.07
Rural Vs. Urban: Rural	1.08 (0.99-1.18)	0.09
Ethnicity: Hispanic	1.05 (0.96-1.14)	0.28

Table 3: Logistic Regression including SDI (N=84,721)

Dependent variable=prescription of ≥ 3 PGx medications in outpatient setting

Predictor	Odds Ratio (95% CI)	P-value
SDI percentile	1.00 (1.0-1.0)	0.81
CCI:		
• 1-2	1.70 (1.61-1.80)	<0.001
• 3-4	2.46 (2.27-2.66)	
• ≥5	3.41 (3.17-3.68)	
Sex: Male	0.76 (0.72-0.79)	<0.001
Age by decade	1.06 (1.05-1.08)	<0.001
Race: non-White	0.94 (0.88-1.01)	0.14
Rural Vs. Urban: Rural	1.10 (1.002-1.20)	0.04
Ethnicity: Hispanic	1.06 (0.97-1.15)	0.19

Figure 2: Most Frequently Prescribed PGx Medications at UHealth Outpatient Visits in 2018 (N=84,721)



CONCLUSIONS

- SVI, but not SDI, score was a modest predictor of yearly PGx medication burden in the outpatient setting in CO.
- Additional studies evaluating SODH, including SVI, in relation to PGx medication prescribing and testing are needed in diverse patient populations.

ACKNOWLEDGEMENTS

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