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Title

Effects of Social Determinants and Pharmacogenetic Medication Interactions on 90-Day Hospital Readmissions

Priority 1 (Research Category)

Acute and emergency care

Presenters

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Abstract

Context: The present study builds on our prior work that demonstrated an association between pharmacogenetic interactions and 90-day readmission.

Objective: Evaluate aggregate contribution of social determinants, comorbidity, and gene-x-drug interactions to moderate 90-day hospital readmission.

Study Design and Analysis: Non-concurrent cohort study; Multivariable logistic regression

Setting: Hospital/integrated healthcare delivery system in northern Illinois

Population Studied: 19,999 adults tracked from 2010 through 2020 who underwent testing with a 13-gene pharmacogenetic panel

Outcome Measure: 90-day hospital readmission (primary outcome)

Results: Univariate logistic regression analyses demonstrated that strongest associations with 90 day hospital readmissions were the number of medications prescribed within 30 days of a first hospital admission that had Clinical Pharmacogenomics Implementation Consortium (CPIC) guidance (CPIC medications) (5+ CPIC medications, odds ratio (OR) = 7.66, 95% confidence interval 5.45–10.77) ($p < 0.0001$), major comorbidities (5+ comorbidities, OR 3.36, 2.61–4.32) ($p < 0.0001$), age (65 + years, OR = 2.35, 1.77–3.12) ($p < 0.0001$), unemployment (OR = 2.19, 1.88–2.64) ($p < 0.0001$), Black/African-American race (OR 2.12, 1.47–3.07) ($p < 0.0001$), median household income (OR = 1.63, 1.03–2.58) ($p = 0.035$), male gender (OR = 1.47, 1.21–1.80) ($p = 0.0001$), and one or more gene-x-drug interaction (defined as a prescribed CPIC medication for a patient with a corresponding actionable pharmacogenetic variant) (OR = 1.41, 1.18–1.70). Health insurance was not associated with risk of 90-day readmission. Race, income, employment status, and gene-x-drug interactions were robust in a multivariable logistic

regression model. The odds of 90-day readmission for patients with one or more identified gene-x-drug interactions after adjustment for these covariates was attenuated by 10% (OR = 1.31, 1.08–1.59) ($p = 0.006$). Although the interaction between race and gene-x-drug interactions was not statistically significant, White patients were more likely to have a gene-x-drug interaction (35.2%) than Black/African-American patients (25.9%) who were not readmitted ($p < 0.0001$).

Conclusions: These results highlight the major contribution of social determinants and medical complexity to risk for hospital readmission, and that these determinants may modify the effect of gene-x-drug interactions on rehospitalization risk.