Modeling cost savings following use of Pharmacogenetic testing in a regional accountable care organization

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Introduction

Background

- Pharmacogenetic testing (PGx) has been shown to decrease healthcare resource utilization in a variety of settings, including behavioral health.[1,2]
- Polypharmacy patients incur greater healthcare costs and identifying those who can benefit from a medication management review and/or pharmacogenetic (PGx) test may lower overall cost of care.[3,4]
- Behavioral health (BH) utilization of healthcare services is much higher than non-BH patients.[5]
- We have developed a method to receive population level patient drug data, analyze potential drug-drug interactions (DDI), impute drug-drug-gene interactions (DDGI) and stratify individuals for PGx testing candidacy.[6]

Objectives

- To analyze an accountable care organization's (ACO) medication and medical claims data and apply prior reported patient savings to understand the ROI of a PGx population health analytics platform

Methods

- We received de-identified medication and medical claims data from an accountable care organization dated January 2021 through March 2021 (n=1825; 18-88 years of age)
- Individual patient medication profiles were analyzed through a PGx population health software that stratifies individuals into tiers of drug-drug and drug-drug-gene projected interaction risk. This system has been described elsewhere.[6]
- PGx population health software was used to identify individuals with an estimated moderate/major drug-drug-gene interaction risk of >80%
- Additional behavioral health cohorts and polypharmacy cohorts were identified
  - Patients receiving psychotropic drugs were assumed to have a behavioral health diagnosis; this is consistent with HEDIS designation of behavioral health
  - Polypharmacy defined as >5 current medications
- Apply inflation adjusted, estimated cost savings to total population and each sub-cohort based on historical PGx economic data (Perlis et al)[2]
  - ↓ 40% ER visits
  - ↓ 58% inpatient admissions
  - Price of test included in savings calculation ($906 for state Medicaid)
- Examine projected cost savings for different cohorts
  - Behavioral Health [BH]
  - Polypharmacy [Poly]
  - >80% risk of Moderate/Major Drug-Drug-Gene Interactions [>80% risk]

Results

The greatest expected inflation adjusted savings following PGx testing was $3,224 over a 3-month period, which came from polypharmacy patients who were also taking at least one psychotropic. Savings are expected to accrue primarily from decreased emergency room visits and in-patient stays. The projected 3-month return on investment (ROI) for this ACO based on the patients in this cohort is 3.6 fold the investment. The greatest 6-month projected ROI is for individuals with a behavioural health diagnosis and a>80% risk of moderate/major drug-drug-gene interactions (6.1-fold).

Figure 1: Patient Cohorts

Sample population observations: 1825 total patients

45% (818) of patients have an imputed Behavioral Health diagnosis [BH]

41% (752) of patients are designated as polypharmacy patients (>5 medications) [Poly]

26% (472) of patients are above the 80th percentile for risk of Moderate or Major drug-drug interactions [>80% risk]

354 of these patients have an imputed behavioral health diagnosis [BH>80% risk]

27% (496) of patients are both polypharmacy and behavioral health patients [BH Ploy]

Figure 2: Patients in each drug-gene interaction risk cohort

Risk deciles for Moderate/Major drug-drug-gene interaction (n=1825)

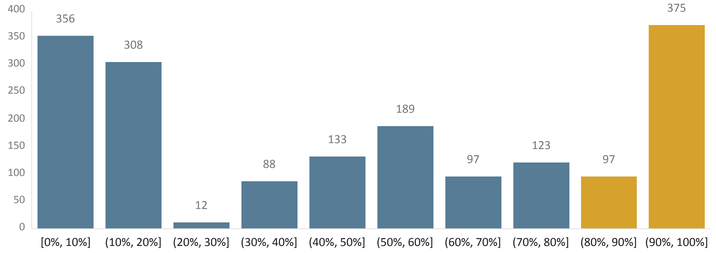


Figure 3: 3-month cost per patient across all cohorts

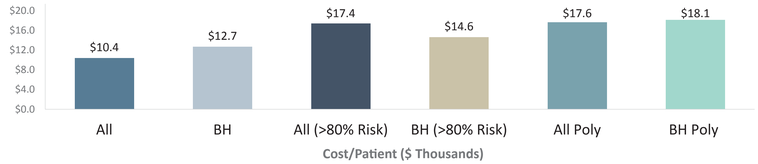
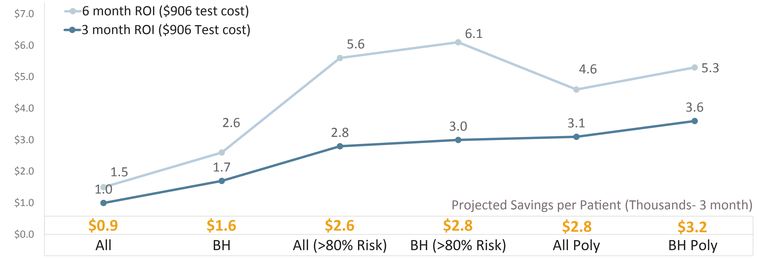


Figure 4: 3-month and 6-month projected ROI across cohorts



Conclusions

Using a PGx population health software tool can help stratify patients into tiers of drug-drug and drug-drug-gene interaction risk, which may help identify best candidates for testing and decrease healthcare costs

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