Does Consumer Purchasing Data Improve Medication Adherence Predictions for the CMS Star Categories?

Abstract

Background: The three drug categories that CMS assesses adherence comprise approximately 28% of the Part D plan (PDP) sponsor and 11% of the Medicare Advantage (MAPDP) total Star score. When performing adherence predictive modeling, little is known about the additional predictive value of consumer purchasing data to already available pharmacy benefit manager (PBM) member information.

Objective: Identify adherence predictors in the three Medicare Star ratings drug categories with and without consumer purchasing data and assess the added value of consumer purchasing data.

Methods: Adherence was calculated using the CMS proportion of days covered (PDC) method in 2013 and 2014 among 1 million Medicare members for drug categories: diabetes, cholesterol (statins), and hypertension (RAS antagonists). The 2013 dataset was partitioned into training and validation datasets to fit the best model. The models incorporated 80 potential predictors from each individual’s pharmacy claims, demographic derived from zip code, pharmacy risk grouper (PRG) severity of illness score, insurance type (MAPDP or PDP), cost share (copay), and enrollment data. The consumer purchasing data consisted of an addition 300 potential predictors. Logistic regression models were developed with and without the consumer purchasing data, to identify significant adherence predictors and to make model accuracy comparisons using the receiver operator curve (ROC) with a range of 0 to 1 where 1 is a perfect prediction.

Results: The predictive models consisted of 166,593 diabetes, 607,374 statins, and 585,656 hypertension members. The predictive models without consumer purchase information found the following independent predictors of future adherence (PDC ≥80%): prior year adherence, a 90 day supply claim, generic drug category cost share of $4 or less, PRG score, zip code derived: percent of white, percent of high school graduate and median income; enrollment in a Medicare Advantage plan, not receiving a low income subsidy, younger age, and new enrollment to the plan in the previous year. Consumer purchasing data was matched to 48% of members and resulted in two new predictors: self reported household income and interest in changing auto insurance policy. The ROC scores with and without consumer purchasing data were: diabetes 0.720 vs 0.711, cholesterol 0.727 vs 0.704, and hypertension 0.708 vs 0.703.

Conclusion: In this Medicare Star medication adherence categories predictive modeling study, the addition of consumer purchasing data did not substantially change the list of independent predictors or improve the predictive model accuracy.