Improving the prediction of medication compliance: the example of bisphosphonates for osteoporosis.

INTRODUCTION: Administrative claims data have a limited ability to identify persons with high compliance to oral bisphosphonates. We tested whether adding information on compliance with other drugs used to treat chronic, asymptomatic conditions would improve the predictive ability of administrative data to identify adherent individuals.

METHODS: Using data from a large, US healthcare organization, we identified new bisphosphonate users and their 1-year compliance to oral bisphosphonates, quantified by the Medication Possession Ratio (MPR). Multivariable logistic regression models evaluated the relationship between high bisphosphonate compliance (MPR $\geq 80\%$) and patient demographics, comorbidities, and health services utilization. To these logistic regression models, we evaluated the incremental change in the area under the receiver operator curve (AUC) after adding information regarding compliance with other drug classes. These included antihyperlipidemics (statins), antihypertensives, antidepressants, oral diabetes agents, and glaucoma medications. Results from the logistic regression models were evaluated in parallel using recursive partitioning trees with 10-fold cross-validation.
RESULTS: Among 101,038 new bisphosphonate users, administrative data identified numerous nonmedication factors (eg, age, gender, use of preventive services) significantly associated with high bisphosphonate compliance at 1 year. However, all these factors in aggregate had low discriminant ability to identify persons highly adherent with bisphosphonates (AUC = 0.62). For persons who were new users of $\geq 1$ of the other asymptomatic condition drugs, MPR data on the other drugs substantially improved the prediction of high bisphosphonate compliance. The impact on prediction was largest for concomitant statin users (AUC = 0.70).

CONCLUSIONS: Information on compliance with drugs used to treat chronic asymptomatic conditions improves the prediction of compliance with oral bisphosphonates. This information may help identify persons who should receive targeted interventions to promote compliance to osteoporosis medications.

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